French Ltd. Project

FLTG, Inc.

Crosby, Texas

MONTHLY PROGRESS REPORT

Submitted to:

U.S. Environmental Protection Agency - Region 6
and
Texas Water Commission

April, 1994

C79320

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1.0 INTRODUCTION

This report covers the activities of FLTG, Inc. and the French Limited Project for April, 1994. FLTG, Inc. manages the project for the French Limited Task Group of Potentially Responsible Parties.

During April, 1994, the project team focused on the following activities and issues:

- Health, Safety, and Quality
- Safety awareness.
- Contractor safety.
- HAZOP of daily work assignments.
- Detecting and correcting work place hazards.
- Response to changing site conditions.
- Wet and slippery conditions.
- Safe lifting procedures.
- Slipping, tripping, and falling hazards.
- Safe work practices in congested conditions.
- Treatment of Cell D/F water to meet effluent specifications.
- Backfill Cell F.
- Maintain DO, OUR, HMB, and plate count in Cell F.
- Contour grading and topsoil placement in Cell E.

- Operation and maintenance of the aquifer remediation system.
- In-situ aquifer bioremediation.
- Install additional INT and S1 wells.
- Define chlorinated plume in INT zone to S.W.
- DNAPL response options.
- Construction bids for INT-11 area containment.
- Water treatment plant operation and maintenance.
- Management of carbon blending system to minimize carbon consumption.
- Operation of the data base management system.
- Wetlands restoration site selection.

This report includes:

- A summary of April activities, issues, and progress.
- Lagoon Demobilization activities, issues, and progress.
- Groundwater and Subsoil Remediation activities, issues, and progress.
- Groundwater Treatment Plant activities, issues, and progress.
- Ambient Air Management status.
- QA/QC status and data.
- Site management activities, issues, and progress.
- Wetlands restoration status.

2.0 SUMMARY

2.1 Summary of Activities and Progress

2.1.1 Health and Safety

There were no personal injury or equipment damage incidents.

All site workers earned the April safety bonus.

Conducted safety meetings and job inspections at the start of each shift; reviewed safety issues before starting all jobs.

All employees and contractors attended daily safety meetings.

Conducted daily mini-HAZOP of all specific jobs.

Supervision made 408 specific on-the-job safety contacts.

Emphasized hand and body pinch points.

Emphasized slips, trips, and falls.

Reviewed hazards associated with wet weather and lightning storms.

Reviewed hazards associated with changing conditions.

Reviewed personal protective equipment requirements with all site workers.

Inspected and certified all fire extinguishers.

Conducted specific fire extinguisher use training.

Inspected all contractor equipment before on-site use.

Inspected all vendor delivery trucks before site entry.

Conducted 28 specific health and safety inspections.

Documented site health and safety inspections; conducted follow-up inspections.

Logged all safety issues each shift; less than 24-hour response to all safety issues.

Continued lottery ticket daily safety awareness incentive program; all regular site employees receive a Texas lottery ticket each day; tickets can be "lost" due to safety violations; employee response has been excellent.

Conducted personnel exposure monitoring, and all results were within acceptable levels. The most recent results are in Table 2-1.

Updated employee training records.

2.1.2 Quality/QAQC/Data Base Management

The total quality process was used. The status of the goals is shown on Table 2-2. The safety, health, security, ambient air management, migration control, aquifer remediation, lagoon remediation, analytical cost, and overtime goals were met.

The technical support MH goal was exceeded due to additional pumping and injection wells and revision of the DNAPL risk evaluation and response option evaluation.

Backfill was prevented on nine days due to wet weather and on four days due to tornado response assistance.

Raw data is being validated as per the plan.

The data base management system operated full on-line with no major problems or delays.

There were no data or reports rejected due to errors.

American Analytical continued to provide quality data on time.

2.1.3 Lagoon Remediation

The four dredges and the workboat remain in Cell F.

Maintained a high level of biological activity in Cell D/F; OUR, HMB, and plate counts are high. Added O_2 to Cell D/F using downdraft aerators.

The Lefco unit treated and discharged about 2.7 million gallons of water; the Lefco unit operated at lower flow due to polymer build up on the membranes.

A test program was started to evaluate and correct the polymer build up problems.

About 9,700 cubic yards of backfill were placed in Cell F.

Continued interim grading and topsoil placement in Cell E.

Continued on-call schedule and specific procedures to close the west end floodwall access in the event of a flood.

Developed a plan to permanently close the west end floodwall access.

2.1.4 Ambient Air Management

Ambient air quality was manually checked daily with portable analyzers, and no response action was required.

Time-integrated samples were collected in three work areas, and the results indicated no exposure; the data is shown in Table 2-1.

2.1.5 Aquifer Remediation

Monitored status of DNAPL plumes.

DNAPL flow to S1-13 and S1-16 is erratic; S1-12 continued to show low levels of DNAPL.

DNAPL flow in S1-16 has remained low.

Direct drive pump in S1-16 continued to perform well.

Repiped the S1-16 well discharge to pump to the water treatment plant.

Discussed DNAPL remedial response objectives and criteria with EPA and TNRCC.

Revised the DNAPL risk evaluation report.

Continued to develop and evaluate DNAPL response options.

Requested and received bids for the INT-11 area containment wall.

Continued routine S1 and INT oxygen and nutrient injection; continued to improved the measurement and control of nutrient additions.

Converted to higher concentration KNO_3 to increase the KNO_3 content of the injection water.

Issued weekly well status and performance reports.

Inspected and adjusted all wells each day.

Continued daily maintenance of recovery and injection wells.

Chlorinated seven production wells to decrease the biomass build up and to increase well flow, and the results were very positive.

Redeveloped eleven production wells by jet surging and air purging; the results were mixed.

Biomonitoring continued to indicate an active and diverse in-situ biological system.

Completed monthly well measurements and sampling; TOC results show a steady decrease in concentration.

Continued installation of additional monitoring, injection, and pumping wells in selected INT and S1 areas to expedite the in-situ bioremediation; completed production and injection well installation; put seven new injection wells in service.

Maintained O_2 content of injection water at about 30-40 ppm.

Expanded the pulse pumping area in sections of the S1 zone South of Gulf Pump Road; the results continue to look positive.

2.1.6 Groundwater Treatment

Elevated Cu and Ag in the plant nutrients caused elevated Cu and Ag in the effluent; use of the suspect nutrient was stopped and the effluent returned to within specified levels.

The carbon blending system operated with no problems.

The carbon absorbers were flushed and recharged on one occasion.

The water treatment plant operated 97% of the time; the downtime was due to the carbon change and due to cleaning the reactor discharge screens.

The in-line filters on the discharge lines from the bioreactors continue to be effective in removing media pieces.

TOC input to T-101 continued to decrease as the flows from the wells inside the floodwall decreased and as the TOC decreased from most wells.

TOC reduction through the Water Treatment Plant has responded to the variations in input TOC; TOC reduction through the bioreactors increased as the biomass diversified.

Biological cultures developed from the lagoon biomass continue to work well in the reactors.

The process operators collected all the process water and ground water samples.

2.1.7 *Wetlands Restoration*

Submitted site selection report for agency review and comment.

Presented the Brownwood design plan to the agency review committee.

Submitted a draft site access agreement to the City of Baytown.

Reviewed the site selection process and the results with the agencies, the public, and political leaders.

2.1.8 Site Management and Issues

Used the on-site laboratory to process all the operational control samples.

Reviewed lagoon and aquifer progress and plans in detail with EPA and TWC on a regular basis.

Continued equipment salvage and sales; several site visits were made by interested parties.

Reviewed project status and issues each day to ensure focus on critical issues - safety, quality and cost.

Issued weekly cost, schedule, and maintenance reports.

Reviewed progress on issues and action plans each week.

Reduced technical support MH's.

Tested the flood gate on one occasion.

Developed a plan and schedule to demobilize the South side technical office.

Developed basis for the May, 1994, total project L.E.

Provided assistance and support for nearby tornado damaged area.

TABLE 2-1

Ambient Air Management
Time Integrated Exposure Data

Compound	PEL 8 hour PPM	M01D0039 21-Apr-94 Well Operator		M01D0039 21-Apr-94 GWTP Operator		M01D0039 21-Apr-94 Rochem Operator	
		% of PEL	PPM	% of PEL	PPM	% of PEL	PPM
Chloromethane	50	0.000	0.000	0.000	0.000	0.000	0.000
Bromomethane	5	0.000	0.000	0.000	0.000	0.000	0.000
Vinyl chloride	1	0.000	0.000	0.000	0.000	0.000	0.000
Chloroethane	1000	0.000	0.000	0.000	0.000	0.000	0.000
Dichloromethane	50	0.016	0.008	0.003	0.001	0.002	0.001
Acetone	750	0.015	0.110	0.002	0.015	0.002	0.013
Carbon disulfide	10	0.000	0.000	0.000	0.000	0.000	0.000
1,1-Dichloroethene	5	0.000	0.000	0.000	0.000	0.000	0.000
1,1-Dichloroethane	100	0.002	0.002	0.001	0.001	0.000	0.000
trans-1,2-Dichloroethe	200	0.002	0.004	0.000	0.000	0.000	0.000
Chloroform	10	0.046	0.005	0.059	0.006	0.018	0.002
1,2-Dichloroethane	10	0.025	0.003	0.030	0.003	0.012	0.001
2-Butanone	200	0.004	0.009	0.001	0.002	0.003	0.007
1,1,1-Trichloroethane	350	0.021	0.073	0.005	0.016	0.008	0.029
Carbon Tetrachloride	5	0.023	0.001	0.011	0.001	0.006	0.000
Vinyl acetate	10	0.000	0.000	0.000	0.000	0.000	0.000
Bromodichloromethane			0.000		0.000		0.000
1,2-Dichloropropane	75	0.000	0.000	0.000	0.000	0.000	0.000
cis-1,3-Dichloropropen	1	0.000	0.000	0.000	0.000	0.000	0.000
Trichloroethene	50	0.002	0.001	0.002	0.001	0.000	0.000
Dibromochloromethane			0.000		0.000		0.000
1,1,2-Trichloroethane	10	0.000	0.000	0.000	0.000	0.000	0.000
Benzene	1	1.173	0.012	0.465	0.005	0.084	0.001
trans-1,3-Dichloroprop	1	0.000	0.000	0.000	0.000	0.000	0.000
2-Chloroethylvinyl ether			0.000		0.000		0.000
Bromoform	0.5	0.000	0.000	0.000	0.000	0.000	0.000
4-Methyl-2-pentanone	50	0.008	0.004	0.002	0.001	0.009	0.004
2-Hexanone	5	0.007	0.000	0.012	0.001	0.011	0.001
Tetrachloroethene	50	0.003	0.002	0.003	0.002	0.001	0.000
1,1,2,2-Tetrachloroet	1	0.000	0.000	0.000	0.000	0.000	0.000
Toluene	100	0.006	0.006	0.005	0.005	0.001	0.001
Chlorobenzene	10	0.000	0.000	0.000	0.000	0.000	0.000
Ethylbenzene	100	0.002	0.002	0.001	0.001	0.001	0.001
Styrene	50	0.001	0.000	0.001	0.001	0.000	0.000
Xylene (total)	100	0.003	0.003	0.003	0.003	0.002	0.002
Hexane			0.004		0.004		0.002

TABLE 2-2

Project Quality

Status as of 4/30/94	Goals		
Yes	1)	No OSHA recordable injuries.	
Attention	2)	100% compliance with all safety rules and procedures.	
Yes	3)	No citations for violations of applicable, relevant and appropriate regulations.	
Yes	4)	100% attendance (including subcontractors) at daily safety meetings.	
Attention	5)	Less than 24-hour response time on health and safety issues.	
Yes	6)	100% sign-in and security clearance.	
Yes	7)	No invalidation of reported data due to QA/QC issues.	
	8)	Spend less than:	MH/Month
Yes		• Direct hire	3,000
Yes		• FLTG management (5 people)	700
Attention		• Technical support (5 people)	900
Yes		• Maintenance support	120
Attention	9)	Pump at least 140 gpm; inject at least 100 gpm.	
Attention	10)	Remediate shallow alluvial zone aquifer in 60 months.	
Action	11)	Pump and treat 3.8 million gallons of lagoon water per month.	
Action	12)	Place 30,000 yds.^{3} of fill in the lagoon per month.	
Yes	13)	Hold analytical cost to less than $20,000 per month (1994 only).	
Yes	14)	No unscheduled overtime (per day or per week).	
Yes	15)	No agency contacts which require 3rd party resolution.	
Yes	16)	Documented training of site personnel for all work assignments.	
Yes	17)	Weekly audit of actual performance versus goals.	

TABLE 2-3
Treated Water Results Summary

Collected	Set No.	pH (6-9)		TSS 5 PPM		TOC 55 PPM		O&G 15 PPM		Benzene 150 PPB		Chlor HC's 500 PPB		Total PCBs 0.65 PPB		Napthalene 300 PPB	
		Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg
17-Jan-94	M03A0203	7.79		1.05		9.		2.7		2.5		8.		.13		5.	
20-Jan-94	M03A0202	7.75		1.		6.1		2.7		2.5		8.		.13		5.	
24-Jan-94	M03A0204	7.6		2.		12.		2.7		2.5		19.		.13		5.	
27-Jan-94	M03A0205	7.5		1.		11.		2.7		2.5		16.		.13		5.	
31-Jan-94	M03A0206	8.02		2.1		6.2		2.8		2.5		50.		.13		5.	
3-Feb-94	M03A0207	7.6		1.		3.8		2.8		2.5		26.		.13		5.	
7-Feb-94	M03A0208	7.57		1.1		12.		2.15		2.5		19.		.13		5.	
10-Feb-94	M03A0209	7.98		2.		9.7		2.8		2.5		45.		.13		5.	
14-Feb-94	M03A0210	8.04	7.76	1.	1.36	3.8	8.18	2.8	2.68	2.5	2.5	37.	25.33	.13	.13	5.	5.
17-Feb-94	M03A0211	7.87	7.77	2.	1.47	4.2	7.64	2.15	2.62	2.5	2.5	15.	26.11	.13	.13	5.	5.
21-Feb-94	M03A0212	7.53	7.75	1.	1.47	8.6	7.92	2.15	2.56	2.5	2.5	21.	27.56	.13	.13	5.	5.
24-Feb-94	M03A0213	8.14	7.81	2.2	1.49	4.	7.03	2.8	2.57	2.5	2.5	19.	27.56	.13	.13	5.	5.
28-Feb-94	M03A0214	7.94	7.85	1.	1.49	4.8	6.34	2.8	2.58	2.5	2.5	19.	27.89	.13	.13	5.	5.
3-Mar-94	M03A0215	7.62	7.81	1.	1.37	8.1	6.56	2.8	2.58	2.5	2.5	50.	27.89	.13	.13	5.	5.
7-Mar-94	M03A0216	7.78	7.83	1.	1.37	10.	7.24	2.15	2.51	2.5	2.5	105.	36.67	.13	.13	5.	5.
10-Mar-94	M03A0217	7.73	7.85	2.	1.47	17.	7.8	2.7	2.57	2.5	2.5	122.	48.11	.13	.13	5.	5.
14-Mar-94	M03A0218	7.87	7.84	2.	1.47	3.3	7.09	2.8	2.57	2.5	2.5	26.	46.	.13	.13	5.	5.
17-Mar-94	M03A0219	7.75	7.8	1.	1.47	.5	6.72	2.8	2.57	2.5	2.5	14.	43.44	.13	.13	5.	5.
21-Mar-94	M03A0220	7.87	7.8	4.2	1.71	18.	8.26	2.8	2.64	2.5	2.5	243.	68.78	.13	.13	5.	5.
24-Mar-94	M03A0221	7.52	7.8	2.	1.82	20.2	9.54	2.95	2.73	2.5	2.5	78.	75.11	.13	.13	5.	5.
28-Mar-94	M03A0222	8.	7.79	1.	1.69	10.	10.21	2.8	2.73	2.5	2.5	77.	81.56	.13	.13	5.	5.
31-Mar-94	M03A0223	7.93	7.79	1.1	1.7	40.	14.12	2.8	2.73	2.5	2.5	520.	137.22	.13	.13	10.	5.56
5-Apr-94	M03A0224	7.76	7.8	3.	1.92	38.9	17.54	.5	2.48	2.5	2.5	48.	137.	.13	.13	5.	5.56
7-Apr-94	M03A0225	7.5	7.77	.5	1.87	35.6	20.39	2.5	2.52	2.5	2.5	465.	177.	.13	.13	5.	5.56
11-Apr-94	M03A0226	7.48	7.74	5.	2.2	46.4	23.66	2.5	2.49	2.5	2.5	474.	216.11	.13	.13	5.	5.56
14-Apr-94	M03A0227	7.79	7.73	4.	2.42	14.	24.84	2.5	2.46	2.5	2.5	58.	219.67	.13	.13	5.	5.56
18-Apr-94	M03A0228	7.61	7.72	2.	2.53	50.9	30.44	2.5	2.43	2.5	2.5	633.	288.44	.16	.13	5.	5.56
21-Apr-94	M03A0229	7.62	7.69	4.	2.51	52.5	34.28	2.5	2.39	2.5	2.5	530.	320.33	.16	.14	5.	5.56
25-Apr-94	M03A0230	7.62	7.7	4.	2.73	56.3	38.29	2.5	2.34	2.5	2.5	584.	376.56	.16	.14	5.	5.56
28-Apr-94	M03A0231	7.62	7.66	.5	2.68	49.6	42.69	2.5	2.31	2.5	2.5	424.	415.11	.16	.14	5.	5.56

TABLE 2-3 (Continued)
Treated Water Results Summary

Collected	Set No.	As		Ba		Cd		Cr		Cu		Pb		Mn		Hg		Ni		Se		Ag		Zn	
		150 PPB		200 PPB		50 PPB		500 PP		15 PPB		66 PPB		300 PPB		1 PPB		148 PPB		20 PPB		5 PPB		162 PPB	
		Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	-Av	Daily	R-Av	Daily	R-Av	Daily	R-Av	Daily	-Av	Daily	R-Avg	Daily	R-Avg	Daily	-Av	Daily	R-Avg
17-Jan-94	M03A0203	7.4		15.3		2.5		2.	.2	2.5		21.		15.2		.1		9.5		1.5		2.		21.2	
20-Jan-94	M03A0202	10.9		12.1		2.5		2.	.4	2.5		21.		14.8		.1		9.5		1.5		2.		15.6	
24-Jan-94	M03A0204	10.		13.2		2.5		2.	.7	2.5		21.		22.9		.1		9.5		1.5		2.		24.4	
27-Jan-94	M03A0205	11.2		10.		2.5		3.5	1.1	2.5		21.		24.		.1		9.5		1.5		2.		30.	
31-Jan-94	M03A0206	17.6		12.		2.5		3.5	1.4	2.5		21.		17.		.1		9.5		1.5		2.		32.	
3-Feb-94	M03A0207	11.8		16.4		2.5		3.5	1.8	2.5		21.		22.5		.1		9.5		.5		2.		28.2	
7-Feb-94	M03A0208	9.9		17.1		2.5		2.	2.1	2.5		21.		25.7		.1		9.5		1.5		1.5		19.	
10-Feb-94	M03A0209	9.3		11.6		2.5		2.	2.3	2.5		21.		11.6		.1		9.5		1.5		1.5		18.4	
14-Feb-94	M03A0210	8.7	10.8	9.8	13.1	2.5	2.5	2.	2.5	2.5	2.5	21.	21.	9.1	18.1	.1	.1	9.5	9.5	1.5	1.4	1.5	1.8	12.8	22.4
17-Feb-94	M03A0211	13.4	11.4	10.1	12.5	2.5	2.5	2.	2.5	2.5	2.5	21.	21.	24.1	19.1	.1	.1	9.5	9.5	1.5	1.4	1.5	1.8	11.2	21.3
21-Feb-94	M03A0212	11.1	11.4	19.4	13.3	2.5	2.5	2.	2.5	2.5	2.5	21.	21.	24.6	20.2	.1	.1	22.	10.9	1.5	1.4	1.5	1.7	24.8	22.3
24-Feb-94	M03A0213	12.1	11.7	8.8	12.8	2.5	2.5	2.	2.5	2.5	2.5	21.	21.	5.	18.2	.1	.1	9.5	10.9	1.5	1.4	1.5	1.7	20.2	21.8
28-Feb-94	M03A0214	8.8	11.4	10.8	12.9	2.5	2.5	2.	2.3	2.5	2.5	21.	21.	12.2	16.9	.1	.1	9.5	10.9	.5	1.3	1.5	1.6	18.8	20.6
3-Mar-94	M03A0215	8.4	10.4	20.6	13.8	2.5	2.5	2.	2.2	2.	2.4	21.	21.	27.5	18.	.1	.1	9.5	10.9	.5	1.2	1.5	1.6	14.4	18.6
7-Mar-94	M03A0216	10.	10.2	21.7	14.4	2.5	2.5	2.	2.	2.5	2.4	21.	21.	20.8	17.8	.1	.1	9.5	10.9	.5	1.2	1.5	1.5	20.3	17.8
10-Mar-94	M03A0217	8.2	10.	25.6	15.4	2.5	2.5	2.	2.	2.5	2.4	20.5	20.9	20.8	17.3	.1	.1	9.5	10.9	.5	1.1	1.5	1.5	10.4	16.8
14-Mar-94	M03A0218	7.1	9.8	30.3	17.5	2.5	2.5	2.	2.	2.5	2.4	20.5	20.9	8.4	16.9	.1	.1	9.5	10.9	.5	.9	1.5	1.5	17.9	16.8
17-Mar-94	M03A0219	9.4	9.8	39.	20.7	2.5	2.5	2.	2.	2.5	2.4	20.5	20.8	7.3	16.7	.1	.1	9.5	10.9	.5	.8	1.5	1.5	13.3	16.8
21-Mar-94	M03A0220	12.2	9.7	31.	23.	2.5	2.5	2.	2.	2.5	2.4	20.5	20.8	32.3	17.7	.1	.1	9.5	10.9	1.	.8	1.5	1.5	17.6	17.5
24-Mar-94	M03A0221	12.8	9.9	19.6	23.	2.5	2.5	2.	2.	2.5	2.4	20.5	20.7	27.4	18.	.1	.1	9.5	9.5	1.5	.8	1.5	1.5	21.9	17.2
28-Mar-94	M03A0222	19.7	10.7	24.	24.7	2.5	2.5	2.	2.	2.5	2.4	20.5	20.7	27.	20.4	.1	.1	9.5	9.5	1.5	.8	1.5	1.5	11.	16.2
31-Mar-94	M03A0223	17.8	11.7	15.7	25.3	2.5	2.5	2.	2.	2.5	2.4	20.5	20.6	25.5	21.9	.1	.1	9.5	9.5	.5	.8	1.5	1.5	10.3	15.2
5-Apr-94	M03A0224	15.	12.5	34.	26.8	1.6	2.4	5.3	2.4	13.3	3.7	3.8	18.7	24.2	21.5	.1	.1	2.5	8.7	6.7	1.5	.3	1.4	28.6	16.8
7-Apr-94	M03A0225	18.9	13.5	.5	24.4	.3	2.2	.9	2.2	7.7	4.3	6.3	17.1	25.4	22.	.1	.1	2.2	7.9	8.4	2.3	9.8	2.3	11.	15.8
11-Apr-94	M03A0226	29.5	15.8	21.2	23.9	.4	1.9	1.	2.1	59.	10.6	4.	15.2	28.4	22.9	.1	.1	11.3	8.1	1.3	2.4	.1	2.1	30.	18.
14-Apr-94	M03A0227	24.1	17.7	13.7	22.1	2.3	1.9	2.2	2.2	41.4	14.9	10.2	14.1	10.6	23.1	.1	.1	13.	8.5	8.6	3.3	12.7	3.4	21.4	18.3
18-Apr-94	M03A0228	18.	18.7	15.	19.4	1.6	1.8	4.3	2.4	22.3	17.1	1.5	12.	27.1	25.3	.1	.1	10.8	8.6	6.	3.9	10.4	4.4	24.6	19.6
21-Apr-94	M03A0229	38.4	21.6	15.	17.6	3.2	1.9	6.7	2.9	27.2	19.8	1.5	9.9	35.7	25.7	.1	.1	16.7	9.4	6.7	4.6	17.6	6.2	33.2	21.3
25-Apr-94	M03A0230	11.	21.4	50.	21.	1.5	1.8	2.5	3.	13.	21.	57.	13.9	21.	25.	.1	.1	7.	9.2	2.5	4.7	2.5	6.3	11.	20.1
28-Apr-94	M03A0231	14.	20.7	50.	23.9	1.5	1.7	2.5	3.	6.	21.4	.8	11.7	23.	24.5	.1	.1	8.	9.	2.5	4.8	2.5	6.4	2.5	19.2

2.2 Problem Areas and Recommended Solutions

Problem	Solution
Maintain high level of safety awareness.	Continue daily lottery ticket program. Daily safety meetings. Supervisory safety contacts.
On-the-Job safety attention.	Contact all employees at least twice per day on safety issues. Review job details as work proceeds.
Changing conditions.	Review status and conditions daily and any time conditions change.
Congested work areas.	Closely coordinate work assignments; adjust schedules.
Hazard detection and response.	Safety inspections.
DNAPL migration in S1-16 and S1-13 area.	Maintain active pumping in S1-16 and S1-13 area to control DNAPL gradient.
Response action plan for DNAPL and DNAPL affected areas.	Complete RIFS and develop response action plan. Install containment wall around INT-11 area.
DNAPL in S1-12.	Monitor status.
Erratic O_2 levels in aquifer.	Replace O_2 metering valves.
Low KNO_3 level in injection water.	Change the control valve; convert to higher concentration of NO_3 in supply.
Low flow in some pumping and injection wells.	Chlorinate selected pumping wells; jet surge and air purge the screen zone on selected wells.

Measurement of biological activity in the aquifer.	Measure plate count, OUR, and HMB monthly. Results show high level of biological activity in aquifer. Coupon measurements confirm activity.
Cell D/F water treatment.	Allow settling time in the lagoon; run test volumes through water treatment plant.
Polymer build up on reverse osmosis unit membranes.	Test methods to separate and settle polymer.
INT zone groundwater sample results indicate plume migration to southwest.	Install 16 new INT wells.
Aquifer compliance criteria.	Continued discussions of approaches.
Non-uniform distribution of nutrients in INT zone.	Operate 39 injection wells; install nine new INT injection wells.
Rebound of chemicals in S1 zone on west end.	Continued pulse pumping test in this zone.
Wetlands site selection.	Recommended "best" site; review site selection process and results with agencies and community leaders.

2.3 Problems Resolved

Problem	Solution
Elevated Cu and Ag in water plant effluent.	Replaced nutrient batch which contained high levels of Cu and Ag.

Wetlands site selection.	Recommended Brownwood site.
Approval of INT-11 containment wall.	Issued a refinement notice which was approved.

2.4 Deliverables Submitted

Final wetlands site evaluation report.

Work plan for additional INT monitoring wells to S.W.

March, 1994 Monthly Report.

2.5 Upcoming/Ongoing Events and Activities

Daily safety meetings and inspections.

Lottery ticket safety awareness program.

Respond to HAZOP audits.

Redevelop low flow injection wells and pumping wells.

Daily well pump checks and maintenance.

Add INT monitoring wells, production wells, and injection wells in the landfill area and in area S.W. of lagoon.

Define extent of plume to S.W.

Add S1 production wells and injection wells in S1-16 and S1-13 areas.

Sample potable wells in Riverside.

Dismantle and decontaminate lagoon equipment.

Permanently replace floodwall on West end.

Continue dewater and backfill of Cell F.

Continue testing polymer removal options.

Grade Cell E for 0.5% downslope to the North.

Place topsoil in Cell E.

Operate Data Base Management System.

Decontaminate scrap steel and pipe and put in the bottom of Cell F.

Total Quality process.

Continue rebound test for S1 wells South of Gulf Pump Road.

Continue biological activity monitoring in S1 wells and INT wells.

Define extent of affected groundwater to the S.W.

Issue DNAPL risk evaluation report.

Develop DNAPL response plan and aquifer compliance criteria.

Review and evaluate bids for INT-11 area containment wall.

Select INT-11 area wall contractor.

Continue QA/QC data confirmation.

Strengthen biomass in Water Treatment Plant.

Construct water collection and handling system.

Optimize carbon usage in Water Treatment Plant.

Continue wetlands restoration project.

2.6 Key Staffing Changes

None.

2.7 Percent Complete

Research & Development	- 98%
Facilities	- 100%
Slough	- 100%
Subsoil Investigation	- 100%
Floodwall	- 100%
Lagoon Remediation	- 100%
Groundwater	- 55%
Lagoon Dewatering/Fixation	- 60%
Water Treatment	- 50%
Wetlands	- 27%
Demobilization	- 50%
Monitoring	- 39%

2.8 Schedule

All deliverables are on schedule.

Complete active aquifer remediation by January 1, 1996.

2.9 Operations and Monitoring Data

The operations and monitoring data are submitted as parts of Sections 3.0, 4.0, 5.0, and 6.0 of this report and are stored in secure storage at the French project office.

2.10 Credits Accrued/Applied

Status of Credits

	Accrued this period	Accrued to date	Applied this period	Applied to date	Running total
December 1990	34	34	0	0	34
January 1991	28	62	0	0	62
February 1991	6	68	0	0	68
March 1991	0	68	0	0	68
April 1991	22	90	0	0	90
May 1991	3	93	0	0	93
June 1991	6	99	0	0	99
July 1991	1	100	0	0	100
August 1991	0	100	0	0	100
September 1991	0	100	0	0	100
October 1991	0	100	0	0	100
November 1991	0	100	0	0	100
December 1991	0	100	0	0	100
January 1992	0	100	2	2	98
February 1992	0	100	0	2	98
March 1992	0	100	0	2	98
April 1992	1	101	0	2	99
May 1992	0	101	0	2	99
June 1992	0	101	0	2	99
July 1992	0	101	0	2	99
August 1992	0	101	0	2	99
September 1992	0	101	0	2	99
October 1992	0	101	0	2	99
November 1992	0	101	0	2	99
December 1992	0	101	0	2	99
January 1993	0	101	0	2	99
February 1993	0	101	0	2	99
March 1993	0	101	0	2	99
April 1993	0	101	0	2	99
May 1993	0	101	0	2	99
June 1993	0	101	0	2	99
July 1993	0	101	2	4	97
August 1993	2	103	0	4	99
September 1993	0	103	0	4	99
October 1993	0	103	0	4	99
November 1993	1	104	0	4	100
December 1993	0	104	0	4	100
January 1994	0	104	0	4	100
February 1994	0	104	0	4	100
March 1994	0	104	0	4	100
April 1994	0	104	0	4	100

2.11 Community Relations

Maintained 24-hour, call-in Hot Line.

Conducted six site tours for interested parties.

Reviewed site status with Crosby Chamber of Commerce.

Contacted nearby local residents with update on site operation.

Contacted several Riverdale residents with site status report.

Responded to numerous contacts in regards to wetlands site selection.

Conducted several community meetings to review the wetlands project.

3

3.0 LAGOON BIOREMEDIATION

3.1 Summary of Activities

Completed biomass stabilization in Cell E with pebble lime, a 15% lime slurry spray was used for dust control.

Continued to grade Cell E to create 0.5% downslope from South to North; continued to place topsoil on Cell E.

The dredges and workboat remain in Cell F.

Continued to dewater and backfill Cell D/F; pumped and treated 2.7 million gallons and placed 9,700 yards of backfill; the treatment rate was decreased by polymer build up on the reverse osmosis membranes; a testing and evaluation program was started and it appears that pH adjustment may cause the polymer to settle.

Maintained DO, OUR, and HMB in Cell F to reduce the biomass.

3.2 Problems and Response Action

Problem	Recommended Solution
Dusty conditions when handling lime.	Mix lime and biomass in shallow layers. Use 15% lime slurry for dust control.
Polymer build up on membranes.	Adjust pH.

3.3 Problems Resolved

None.

3.4 Deliverables Submitted

None.

3.5 Upcoming Events and Activities

Maintain pH, DO, OUR, and nutrient levels in Cell D/F.

Operate aerator/mixer in Cell D/F.

Continue to dewater and backfill Cell F.

Grade Cell E.

Place topsoil on Cell E and revegetate.

Permanently replace floodwall on West end.

4.0 GROUNDWATER AND SUBSOIL REMEDIATION

4.1 Summary of Activities

4.1.1 Operation of Production and Injection Well Systems

Operation of the production and injection wells systems during April 1994 is summarized in Table 4-1. Flows from the production well system are summarized in Table 4-2 and Figure 4-1. Flows into the injection well system are summarized in Table 4-3 and Figure 4-2. Individual well flows are summarized in Table 4-4. Three new INT unit injection wells (INT-220, -221, and -223) and six new S1 unit injection wells (S1-65, -66, -67, -68, -69, and -70) were placed on line near the end of the month. Flow data from these wells will first appear in next month's Progress Report. A description of the method used to calculate flows, and of changes in the main totalizing meter arrangement, is presented in Attachment 4A.

4.1.2 Operational Monitoring

Operational monitoring associated with the groundwater and subsoil remediation system during April 1994 is summarized in Table 4-5.

4.1.3 Data Management and Evaluation

Operational monitoring data from the groundwater and subsoil remediation system for this reporting period were entered into FLTG's database. Tables and figures for this section of the Monthly Progress Report were generated from this database.

4.2 Problems and Response Actions

The groundwater production and injection rates were both above target. However, certain wells continue to show low flows. To increase flows at low-yielding wells, a program of well development was performed during April 5-12, using Layne Environmental Services' well development rig. High-pressure jetting - which develops evenly over the entire screened interval - was performed, followed by airlifting of developed material. Flows before and after well development, compared with a control group of non-developed wells, are presented in Table 4-6.

Results were mixed. There were no significant changes in flows at the six undeveloped wells. Of the eight wells developed, there were significant increases in flow at four. However, at one of the four (INT injection well INT-82), the increase

Table 4-1

Groundwater System Operation - April 1994 *Reporting Period: March 31 - April 28 (29 days)*
Production System
No. of production wells: 99 (S1 unit, 49; INT unit, 50) No. of operational wells: 97 (S1 unit, 47; INT unit, 50)
Changes in system since last month: none
No. of wells off line since bounceback test: 2; S1-35, S1-43 No. of wells on pulse pumping schedule: 6; S1-23, -33, -34, -36, -38, -42 No. of wells pumping DNAPL: 1; S1-16; ~25 gallons removed in 4/94
Groundwater produced: 6.8 M gal; 176.3 M gal since startup based on main meter Total production rate: avg. 163 gpm (target 140 gpm); range 133 - 203 gpm S1 production rate: avg. 118 gpm; avg. 2.6 gpm per well INT production rate: avg. 45 gpm; avg. 0.9 gpm per well Total flow rate apportioned between S1 and INT units based on individual well meter readings
TOC (non-volatile) concentration avg. 103 ppm; range 40 - 211 ppm TOC mass removed: 5,771 lb (325,413 lb since startup); 199 lb/day
Injection System
No. of injection wells: 47 (S1 unit, 11; INT unit, 36); all operational
Rainfall during period: not measured
Changes in system since last month: Nine new injection wells (3 INT, 6 S1) placed on line near end of month (flow data reporting will start next month); oxygen delivery increased
Groundwater injected: 4.3 M gal (82 M gal since startup) based on main meters Percentage of injected water recycled from RO plant: ~25%
S1 unit injected: 1.9 M gal (47.6 M gal since startup) - see Attachment 4A INT unit injected: 2.4 M gal (34.4 M gal since startup) - see Attachment 4A Total injection rate: avg. 103 gpm (target 100 gpm); range 95 - 117 gpm S1 injection rate: avg. 43 gpm; avg. 3.9 gpm per well INT injection rate: avg. 60 gpm; avg. 1.5 gpm per well Total flow rate apportioned between S1 and INT units based on individual well meter readings
Avg. DO in injection water: S1, 35.3 ppm; INT, 35.9 ppm (target 40 ppm)
Volume of 4.7/9% w/w KNO_3 nutrient solution added to INT unit, S1-58, and S1-59: 13,130/4,211 gal Nutrient flow rate: 750/366 gpd (0.78%/0.38% of INT, S1-58, and S1-59 inflow rate) Calculated injection water NO_3 concentration: 52/50 mg/L-N (target 50 mg/L-N)

Note that average monthly flow rates at individual wells (calculated from weekly individual well flow meter readings) are not used directly to determine S1 and INT unit inflows and outflows, but are used to apportion total production and injection flows (calculated from daily main production and injection meter readings) between S1 and INT units.

Table 4-2

Daily Flows, TOC Concentrations, and TOC Loadings
April 1994

Date	Project Day	T-101 Outflow Rate (FQ-101A) (gpd)	T-101 Outflow Rate (gpm)	T-101 Influent Ave. TOC (mg/L)	T-101 Influent TOC Loading (kg/day)
31-Mar	813	227,300	158	83	72
1-Apr	814	235,300	163	91	81
2-Apr	815	233,700	162	102	90
3-Apr	816	234,800	163	124	110
4-Apr	817	170,200	118	164	106
5-Apr	818	292,900	203	134	149
6-Apr	819	248,200	172	85	80
7-Apr	820	229,900	160	50	44
8-Apr	821	221,400	154	78	66
9-Apr	822	192,000	133	160	116
10-Apr	823	234,000	163	103	91
11-Apr	824	247,100	172	117	110
12-Apr	825	226,100	157	59	50
13-Apr	826	231,900	161	160	140
14-Apr	827	249,400	173	155	147
15-Apr	828	238,200	165	110	99
16-Apr	829	223,800	155	130	110
17-Apr	830	227,500	158	211	181
18-Apr	831	236,800	164	71	63
19-Apr	832	236,000	164	46	41
20-Apr	833	239,600	166	45	41
21-Apr	834	255,600	178	66	64
22-Apr	835	240,100	167	105	96
23-Apr	836	240,800	167	95	87
24-Apr	837	240,500	167	121	110
25-Apr	838	233,600	162	64	57
26-Apr	839	245,500	170	81	75
27-Apr	840	237,000	165	40	36
28-Apr	841	233,100	162	129	114
Month Average		234,562	163	103	90
Month Total		6,802,300			2,623
Project Average		209,664	136	250	176
Project Total		176,327,756			147,915

Table 4-3

Daily Injection Flows
S1 and INT Injection Well Systems
April 1994

Date	Project Day	S1 (pre 1/3/94) Injection Wells Meter FQ-905		S1 Injection Wells (906-909)		INT North Injection Wells Meter FQ-906		INT South Injection Wells Meter FQ-909		Total Injection Rate	
		(gpd)	(gpm)	(gpd)	(gpm)	(gpd)	(gpm)	(gpd)	(gpm)	(gpd)	(gpm)
31-Mar	813	115,700	80	66,000	46	26,200	18	49,700	35	141,900	99
1-Apr	814	121,500	84	69,100	48	26,700	19	52,400	36	148,200	103
2-Apr	815	119,700	83	67,800	47	26,100	18	51,900	36	145,800	101
3-Apr	816	112,000	78	63,500	44	24,400	17	48,500	34	136,400	95
4-Apr	817	113,700	79	65,000	45	25,100	17	48,700	34	138,800	96
5-Apr	818	113,800	79	64,900	45	25,300	18	48,900	34	139,100	97
6-Apr	819	115,100	80	65,100	45	24,800	17	50,000	35	139,900	97
7-Apr	820	118,600	82	67,000	47	24,800	17	51,600	36	143,400	100
8-Apr	821	113,000	78	64,500	45	25,400	18	48,500	34	138,400	96
9-Apr	822	124,200	86	73,400	51	26,300	18	50,800	35	150,500	105
10-Apr	823	124,200	86	73,100	51	26,900	19	51,100	35	151,100	105
11-Apr	824	121,800	85	71,200	49	27,100	19	50,600	35	148,900	103
12-Apr	825	125,200	87	73,200	51	27,300	19	52,000	36	152,500	106
13-Apr	826	123,100	85	72,400	50	26,800	19	50,700	35	149,900	104
14-Apr	827	126,400	88	74,400	52	25,700	18	52,000	36	152,100	106
15-Apr	828	120,600	84	71,200	49	25,600	18	49,400	34	146,200	102
16-Apr	829	118,300	82	69,900	49	25,600	18	48,400	34	143,900	100
17-Apr	830	118,500	82	69,900	49	25,900	18	48,600	34	144,400	100
18-Apr	831	120,200	83	71,100	49	27,100	19	49,100	34	147,300	102
19-Apr	832	120,900	84	49,000	34	28,500	20	71,900	50	149,400	104
20-Apr	833	119,800	83	35,500	25	28,400	20	84,300	59	148,200	103
21-Apr	834	118,700	82	35,100	24	28,300	20	83,600	58	147,000	102
22-Apr	835	122,100	85	44,400	31	28,600	20	77,700	54	150,700	105
23-Apr	836	125,900	87	68,700	48	27,800	19	57,200	40	153,700	107
24-Apr	837	122,600	85	66,400	46	27,500	19	56,200	39	150,100	104
25-Apr	838	123,800	86	67,600	47	27,200	19	56,200	39	151,000	105
26-Apr	839	127,000	88	69,400	48	28,000	19	57,600	40	155,000	108
27-Apr	840	131,200	91	66,200	46	27,300	19	65,000	45	158,500	110
28-Apr	841	141,900	99	68,500	48	26,900	19	73,400	51	168,800	117
Month Average		121,362	84	64,948	45	26,607	18	56,414	39	147,969	103
Month Total		3,519,500		1,883,500		771,600		1,636,000		4,291,100	
Project Average		77,771	54	52,242	36	32,457	23	61,294	43	110,227	77
Project Total		57,861,383		6,007,790		24,147,828		7,048,800		82,009,211	

Table 4-4

Average Production and Injection Flow Rates - April 1994

S1 Production Wells (49 + 4)

Well ID	gpm
S1-1	0.8
S1-2	0.5
S1-3	0.3
S1-4	0.1
S1-5	NM
S1-6	2.2
S1-7	0.8
S1-8	0.5
S1-9	1.2
S1-10	1.9
S1-11	2.5
S1-12	0.3
S1-13	NM
S1-14	0.4
S1-15	0.9
S1-16	NM
S1-17	1.0
S1-18	0.8
S1-19	2.2
S1-20	0.2
S1-21	2.3
S1-22	4.2
S1-23	5.2 PP
S1-24	3.8
S1-25	1.3
S1-26	3.8
S1-27	0.7
S1-28	2.2
S1-29	0.4
S1-30	3.6
S1-31	2.4
S1-32	2.6
S1-33	3.8 PP
S1-34	1.8 PP
S1-35	2.6
S1-36	4.1 PP
S1-37	3.5 PP
S1-38	2.5 PP
S1-39	6.3
S1-40	2.2
S1-41	5.5
S1-42	3.9 PP
S1-43	OFF
S1-44	4.0
S1-45	8.6
S1-46	9.5
S1-47	2.9
S1-48	1.9
S1-60	3.0
S1-61	
S1-62	
S1-63	
S1-64	
Total	115.2
Average	2.6

S1 Injection Wells (11 + 6)

Well ID	gpm
S1-49	2.0
S1-50	4.7
S1-51	2.3
S1-52	4.7
S1-53	4.5
S1-54	4.8
S1-55	3.3
S1-56	5.6
S1-57	2.2
S1-58	0.3
S1-59	5.7
S1-65	
S1-66	
S1-67	
S1-68	
S1-69	
S1-70	
Total	40.1
Average	3.6

Wells S1-58 & -59 receive nutrient-amended injection water

All other S1 wells receive oxygenated injection water only

Notes
OFF - well inoperative
NM - well running but not metered
PP - well in pulse pumping mode

INT Production Wells (50 + 6)

Well ID	gpm
INT-1	0.9
INT-2	0.4
INT-3	0.1
INT-4	0.2
INT-5	0.7
INT-6	0.1
INT-7	0.2
INT-8	0.8
INT-9	0.5
INT-10	2.7
INT-11	0.2
INT-12	1.2
INT-13	0.3
INT-14	0.2
INT-15	0.8
INT-16	0.3
INT-17	0.2
INT-18	0.6
INT-19	1.1
INT-20	0.1
INT-21	0.3
INT-22	0.5
INT-23	0.2
INT-24	0.5
INT-25	0.4
INT-26	0.4
INT-27	2.0
INT-28	0.5
INT-29	2.3
INT-30	1.0
INT-31	1.2
INT-32	1.0
INT-33	0.1
INT-55	3.9
INT-56	0.2
INT-57	1.5
INT-58	1.3
INT-59	0.3
INT-60	2.0
INT-61	0.6
INT-62	0.3
INT-65	1.5
INT-66	0.6
INT-205	0.6
INT-206	1.6
INT-207	0.7
INT-208	1.5
INT-209	0.5
INT-210	2.8
INT-211	1.6
INT-212	
INT-213	
INT-214	
INT-215	
INT-216	
INT-217	
Total	43.8
Average	0.9

INT Injection Wells (36 + 6)

Well ID	gpm
INT-63	1.0
INT-64	3.0
INT-71	2.7
INT-72	1.5
INT-73	0.9
INT-74	1.3
INT-75	1.8
INT-76	2.9
INT-77	2.1
INT-78	1.5
INT-79	1.0
INT-80	1.7
INT-81	0.8
INT-82	0.2
INT-83	1.2
INT-84	2.0
INT-85	1.3
INT-86	1.5
INT-87	1.0
INT-88	1.3
INT-89	3.5
INT-90	2.5
INT-91	1.8
INT-92	2.2
INT-93	0.7
INT-94	0.8
INT-95	1.6
INT-96	1.2
INT-97	0.4
INT-98	1.8
INT-99	2.2
INT-100	1.4
INT-201	1.9
INT-202	0.6
INT-203	1.6
INT-204	1.2
INT-218	
INT-219	
INT-220	
INT-221	
INT-222	
INT-223	
Total	56.2
Average	1.6

All INT injection wells receive nutrient-amended injection water

Note: total and average flow rates for S1 and INT units are corrected (per main flow meter readings) for use in Table 4-1.

Table 4-5

Operational Monitoring - April 1994

Activity	Frequency	Purpose
Check production and injection wells for pump, meter, and level control operation, injection pressure, gas buildup, and flow meter readings.	Daily	Identify and respond to individual well problems; maintain operating efficiency.
Read groundwater treatment plant inflow and outflow meters; nutrient injection flow meters; oxygen flows, pressure and temperature; and injection header back pressure.	Daily (shift changes)	Identify and respond to treatment plant problems; control nutrient and injection flow rates.
Measure T-101 influent and effluent TOC concentrations.	Daily (shift changes)	Track removal of TOC.
Measure rainfall.	Daily	Assists interpretation of water level maps.
Sample for nutrients (K, NO_3) at INT injection wells. Four wells are sampled per week on a three-week schedule, so that a complete survey of the injection system is performed every three weeks.	Weekly	Check on nutrient injection rate.
Measure dissolved oxygen at all S1 and INT injection wells (after 4/15, at ten representative wells).	Weekly	Main control for oxygen injection rate.
Sample T-101 influent for TCL VOC, TOC, and nutrient analysis, (1) from all operating production wells, and (2) from all wells located outside the floodwall.	Monthly	Develop chemical mass balance.
Monitor groundwater levels at all monitoring wells.	Monthly	Verify capture zones.
Monitor in-situ DO at all monitoring wells.	Monthly	Monitor development of aerobic conditions.
Sample groundwater at all production wells for on-site TOC analysis.	Monthly	Track TOC removal.
Sample pulse pumping wells.	Special (Table 4-8)	Monitor effect of pulse pumping.

Table 4-6

Well Development Program

Well	Date developed	2/28/94	3/7/94	3/14/94	3/21/94	3/28/94	4/4/94	4/11/94	4/18/94	4/25/94	5/2/94	Average increase in flow rate (%)	Average increase in flow rate (gpm)	Comments
INT-14	not developed	0.22	0.23	0.18	0.18	0.19	0.17	0.19	0.15	0.14	0.14	-21%	-0.04	
INT-4	not developed	0.20	0.17	0.18	0.16	0.19	0.16	0.16	0.16	0.15	0.16	-11%	-0.02	
INT-3	not developed	0.14	0.13	0.13	0.11	0.07	0.14	0.12	0.12	0.10	0.11	-6%	-0.01	
S1-29	not developed	0.32	0.29	0.34	0.34	0.36	0.36	0.36	0.35	0.34	0.36	5%	0.02	
S1-20	not developed	0.49	0.28	0.32	0.33	0.20	0.12	0.32	0.19	0.11	0.55	1%	0.00	
S1-4	not developed	0.14	0.16	0.13	0.12	0.15	0.12	0.13	0.13	0.13	0.12	-7%	-0.01	
Average undeveloped well flow		0.14	0.16	0.21	0.21	0.19	0.18	0.21	0.18	0.16	0.24	-6%	-0.01	
INT-73	4/5-6/94	0.22	0.22	0.28	0.33	0.40	0.58	**1.10**	**0.43**	**1.32**	**1.29**	206%	0.70	Improved
INT-82	4/6/94	0.03	0.10	0.06	0.01	0.07	0.12	**0.10**	**0.17**	**0.33**	**0.62**	369%	0.24	Well leaking
INT-56	4/4/94	0.24	0.21	0.21	0.21	0.19	0.08	**0.38**	**0.57**	**0.45**	**0.42**	139%	0.27	Improved
INT-33	4/8/94	0.08	0.09	0.09	0.09	0.10	0.11	0.12	**0.20**	**0.20**	**0.18**	99%	0.10	Good
INT-20	4/8/94	0.08	0.08	0.08	0.08	0.10	0.09	0.12	**0.11**	**0.09**	**0.09**	7%	0.01	Not significant
INT-17	4/11/94	0.23	0.18	0.20	0.22	0.19	0.19	0.16	**0.20**	**0.18**	**0.16**	-8%	-0.03	Not significant
INT-7	4/11-12/94	0.23	0.22	0.25	0.19	0.22	0.17	0.17	**0.23**	**0.29**	**0.31**	34%	0.07	Not significant
INT-6	4/12/94	0.09	0.09	0.10	0.10	0.05	0.05	0.09	**0.11**	**0.11**	**0.11**	35%	0.03	Not significant
Average developed well flow		0.09	0.09	0.16	0.15	0.17	0.17	0.28	0.25	0.37	0.40	110%	0.17	

Numbers are calculated flow rates for the week ending date at the top of the column
Figures in bold are flow rates for the weeks following that in which well development.was performed

Figure 4-1

Groundwater Production Rate

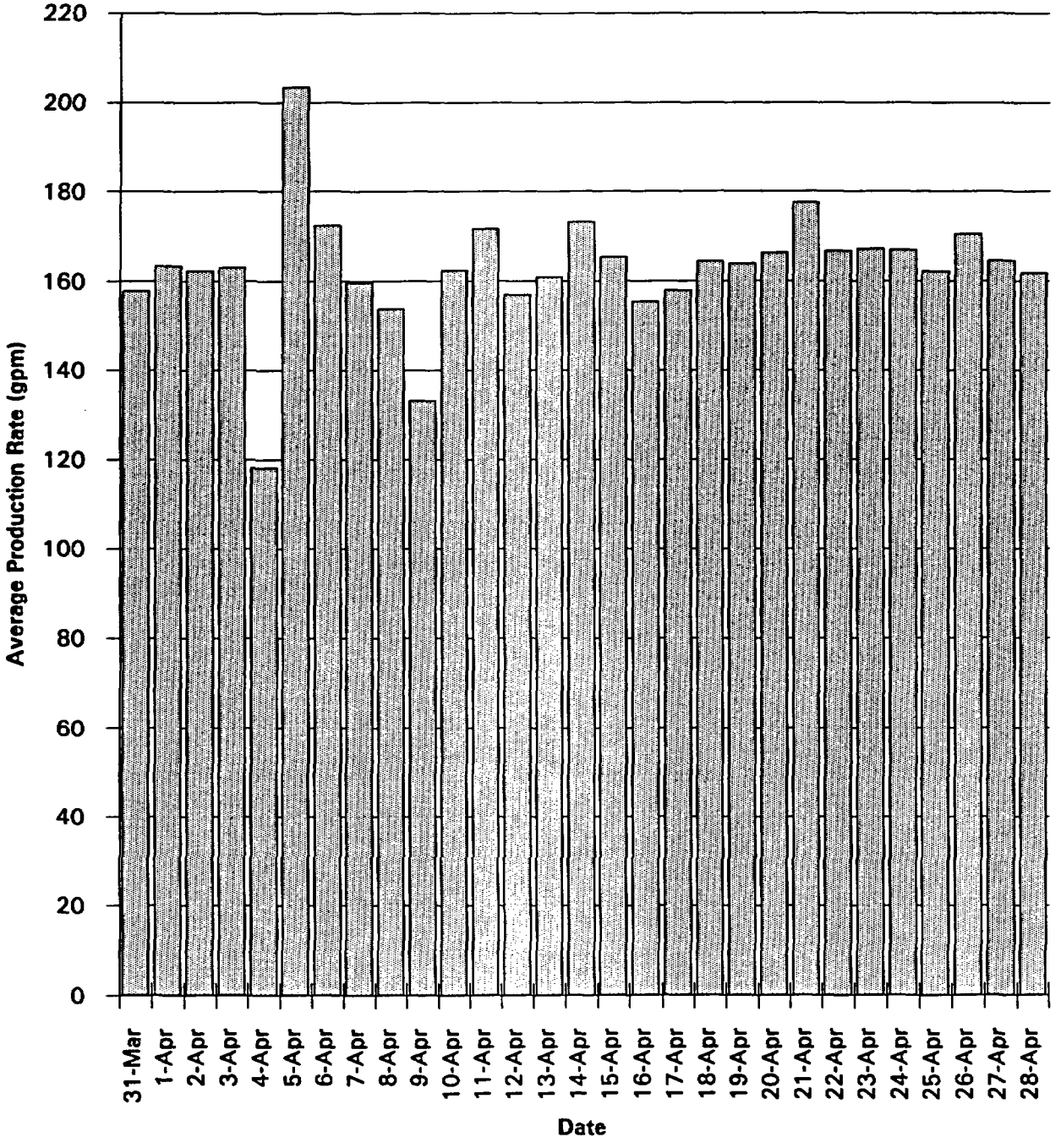
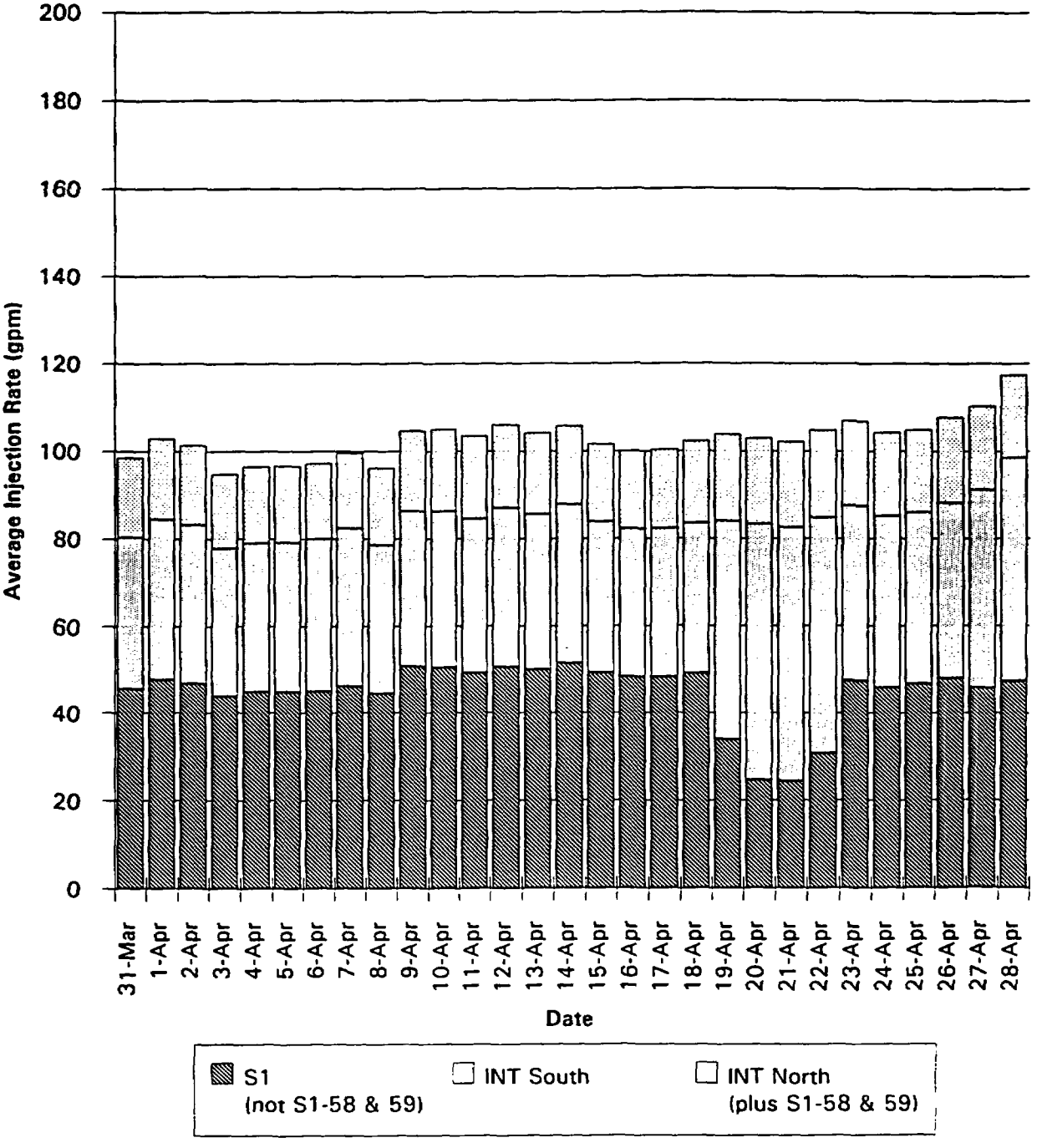


Figure 4-2

Groundwater Injection Rate



was due to surface leaks that appeared after jetting, rather than by development of the formation. Excluding INT-82, flows at developed wells increased by 1.15 gpm (0.16 gpm per well). For an average pre-development flow rate of 0.17 gpm, this is equivalent to installing six additional wells in similar low-permeability areas. Due to the low cost of well development relative to drilling, this program proved to be cost-effective.

Last month, both nutrient and dissolved oxygen concentrations in injection water were below target levels. Measures were taken during April to improve this situation. The low nutrient levels were due to a combination of the increase in injection rates, and the physical limitations on nutrient storage at the site. To remedy this, FLTG obtained a more concentrated nutrient formula (9% w/w) from the nutrient supplier. Addition of the more concentrated potassium nitrate solution at a target rate of 0.38% (to achieve 50 ppm NO_3-N) was started at 3:00 p.m. on April 17.

DO levels were limited by the flow meter on the S1 header, and because offgassing was significant on the INT headers. However, offgassing is acceptable if required to maintain target DO levels. To reach target DO concentrations, a larger capacity flow meter was installed on the S1 header, and oxygen injection rates were increased on the INT headers, on April 7. As a result, DO levels in injection water rose 44%, from an average of 31.8 ppm on April 1, to 45.8 ppm by April 21. Oxygen use in the same period increased by approximately 25%.

4.3 Pending Issues

4.3.1 DNAPL Study

During the month, further progress was made toward completing the Risk Evaluation and Feasibility Study Reports.

4.3.2 Western Area Well Installation

A program of 29 additional INT monitoring, injection, and production wells, to enhance remediation rates in the western part of the plume and to explore its western extension, was started on March 15. For this program, and the eastern area program (see Section 4.3.3), all well locations were first characterized by CPT sounding. This work was performed by Terra Technologies, Inc. Well installation was performed by Layne Environmental Services. Progress to the month end is summarized in Table 4-7. Well locations are shown on Figure 4-3. Wells were all installed and three INT injection wells (INT-220, -221, and 223) were on line by the end of the month.

Table 4-7

Well Installation Program - Progress Report

Updated on May 02 at 11:23 am

Well number	Type of well	CPT date	Depths (ft BGS)				Well construction																
			S1	C1	INT	C2	Method	Dia. (in)	Casing Depth (ft)	TD (ft)	Sump (ft)	Screen (ft)	Top of Screen	Material	Slot Size	Filter Grade	Top of Filter	Top of Seal	Stickup (ft)	(Temp) casing installed	Well installed	Well developed	Gallons removed	Well vols removed	Pad completed
INT-136	M	3/16/94	7.2	19.7	36.0	51.5	HSA	4	NA	52	2	15	35	PVC	10**	20/40	33	31	flush	NA	3/18/94	3/31 - 4/1	393	25.5	3/28/94
INT-140	M	3/17/94	8.9	17.4	31.5	51.5	HSA	4	NA	54	2	20	32	PVC	10	20/40	30	28	flush	NA	3/21/94	3/31 - 4/1	438	20.0	3/28/94
INT-141	M	3/17/94	11.0	20.0	34.0	56.0	HSA	4	NA	59	2	20	37	PVC	10	20/40	35	33	flush	NA	3/22/94	3/31 - 4/1	478	20.4	3/28/94
INT-142	M	3/16/94	10.0	24.0	40.0	59.0	HSA	4	NA	60	2	20	38	PVC	10	20/40	37	35	flush	NA	3/17/94	3/31 - 4/1	460	21.3	3/28/94
INT-143	M	No CPT	16.0	33.0	34.6	50.0	HSA	4	NA	53	2	15	36	SS	10	20/40	34	32	flush	NA	3/24/94	*5/3/94*	*400*		4/27/94
INT-144	M	4/26/94	6.5	16.0	39.7	55.4	HSA	4	NA	56	2	10	43	PVC	10	20/40	40	38	flush	NA	4/29/94	*5/3/94*	*400*		*5/2/94*
INT-145	M	4/26/94	5.2	21.6	37.7	62.0	HSA	4	NA	62	2	20	40	PVC	10	20/40	38	36	flush	NA	4/28/94	*5/3/94*	*400*		*5/2/94*
INT-146	M	4/26/94	5.8	22.2	37.7	58.0	HSA	4	NA	58	2	15	41	PVC	10	20/40	38	36	flush	NA	4/27/94	*5/3/94*	*400*		*5/2/94*
INT-212	P	3/15/94	9.5	22.3	34.6	63.0	WR/TC	6	29.5	63	2	25	36	SS	8	20/40	34	32	2	(4/25/94)	4/25/94	4/29/94	660	8.7	4/27/94
INT-213 #	P	3/30/94*	12.8	21.2	31.5	59.0	WR/TC	6	29.5	59	2	25	32	SS	8	20/40	30	28	2	(4/15/94)	4/15/94	4/29/94	surged	-	4/27/94
INT-214 #	P	3/31/94	13.1	23.3	25.3	47.2	WR/TC	6	24.5	49.3	2	20	27.3	SS	8	20/40	24.5	22.5	2	(4/18/94)	4/19/94	4/29/94	surged	-	4/27/94
INT-215 #	P	3/31/94	11.5	NA	*25.3*	45.3	WR/TC	6	26	49	2	20	27	SS	8	20/40	24.5	22	2	(4/19/94)	4/20/94	4/29/94	surged	-	4/27/94
INT-216	P	3/16/94	14.0	25.6	36.0	59.0	WR/TC	6	29.5	59	2	20	37	SS	8	20/40	35	33	2	(4/13/94)	4/14/94	4/28/94	340	4.5	4/21/94
INT-217 #	P	4/4/94	12.1	20.8	31.8	54.4	WR/TC	6	29.5	54	2	20	32	SS	8	20/40	30	28	2	(4/21/94)	4/21/94	4/29/94	surged	-	4/27/94
INT-218	I	3/22/94*	7.6	25.0	36.5	63.5	MR/WR	2	36	63	2	25	36	SS	10	20/40	33	30	2	3/25/94	4/6/94	4/20/94	jetted	60 gal	4/27/94
INT-219	I	3/21/94	10.8	20.7	33.1	53.5	MR/WR	2	33	56.6	2	20	33	SS	10	20/40	31	29	2	4/4/94	4/11/94	4/19/94	jetted	60 gal	4/21/94
INT-220	I	3/21/94	13.8	NA	23.0	50.5	MR/WR	2	32	52	2	20	30	SS	10	20/40	28	26	2	3/30/94	4/11/94	4/19/94	jetted	-	4/21/94
INT-221	I	3/15/94	12.0	NA	30.0	59.0	MR/WR	2	39	61	2	20	39	SS	10	20/40	37	35	2	3/23/94	4/5/94	4/21/94	jetted	-	4/27/94
INT-222	I	3/21/94	8.5	25.3	40.0	50.2	MR/WR	2	39	52	2	10	40	SS	10	20/40	37.5	35.5	2	3/31/94	4/7/94	4/21/94	jetted	60 gal	4/27/94
INT-223	I	3/22/94	12.0	25.0	29.0	55.0	MR/WR	2	34	57	2	20	35	SS	10	20/40	31	29	2	3/29/94	4/7/94	4/20/94	jetted	-	4/21/94
S1-61	P	3/29/94	14.8	28.4	37.7	NA	HSA	6	NA	28.5	2	10	16.5	SS	20	10/20	14.5	12.5	1	NA	4/11/94	4/26/94	252	13.2	4/27/94
S1-62	P	3/30/94	14.8	27.2	35.8	NA	HSA	6	NA	27.5	2	10	16.5	SS	20	10/20	13.5	11.5	1	NA	4/12/94	4/27/94	210	7.5	4/27/94
S1-63	P	*3/22/94*	*12.5*	*33.5*	*36.0*	NA	HSA	6	NA	34	2	20	12	SS	20	10/20	10	8	1	NA	4/13/94	4/21/94	*360*	*9.1*	4/27/94
S1-64	P	3/23/94	8.0	31.8	36.7	NA	HSA	6	NA	32	2	20	10	SS	20	10/20	8	6	1	NA	4/12/94	4/21/94	353	10.0	4/27/94
S1-65	I	3/25/94	12.8	27.9	33.5	NA	HSA	4	NA	30	2	15	13	PVC	20	10/20	11	9	2	NA	4/12/94	4/19/94	310	28.3	4/20/94
S1-66	I	3/24/94	10.5	25.3	31.2	NA	HSA	4	NA	27	2	15	10	PVC	20	10/20	9	7	2	NA	4/12/94	4/19/94	290	26.6	4/20/94
S1-67	I	3/24/94	9.8	25.6	33.0	NA	HSA	4	NA	28	2	15	11	PVC	20	10/20	10	8	2	NA	4/14/94	4/19/94	350	27.2	4/20/94
S1-68	I	3/24/94	10.2	24.3	34.0	NA	HSA	4	NA	26	2	15	9	PVC	20	10/20	8	6	2	NA	4/13/94	4/19/94	364	32.1	4/20/94
S1-69	I	*3/23/94*	*10.2*	*27.0*	*33.8*	NA	HSA	4	NA	28	2	15	11	PVC	20	10/20	10	8	2	NA	*4/15/94*	*4/19/94*	*385*	*23.6*	4/22/94
S1-70	I	3/24/94	11.8	27.9	34.8	NA	HSA	4	NA	30	2	15	13	PVC	20	10/20	12	10	2	NA	4/14/94	4/19/94	349	20.0	4/22/94
SW-1	SW	3/28/94	11.8	32.8	34.1	56.7																			
SW-2	SW	3/28/94	12.1	32.1	33.5	52.2																			
SW-3	SW	3/29/94	9.2	30.8	34.1	53.0	(SW-1 through SW-6 not to be completed as wells - CPTs are for slurry wall design only)																		
SW-4	SW	3/25/94	7.9	26.7	33.8	51.2																			
SW-5	SW	*3/25/94*	7.5	*25.6*	31.8	49.9																			
SW-6	SW	3/28/94	13.1	30.5	34.4	56.0																			

Italics = planned dates

Notes:

INT-143 logged in detail for DNAPL; no DNAPL detected

Layne prepunched; (1) set 2" casings; (2) backfilled with compacted sand

Black tarry waste with odor at INT-215: sample collected 3/29/94

* INT-218: 3/16/94: refusal at 62 ft; CPT repeated 3/22/94

INT-213: 3/23/94: refusal at 49 ft; CPT repeated 3/30/94

** 35-40 ft, 010 slot; 40-60 ft, 020 slot

Temp conductor casing: 10-1/4 ID HSA

Conductor casing - 6" ID low-carbon steel

Casing and sumps - PVC Schedule 40

Casings, screens, and sumps - flush-threaded

Filter sand placed 2 ft above screen (1 ft for S1 injection)

Bentonite pellet seal at least 2 ft.

Grout - Portland Type I, 2-6% bentonite

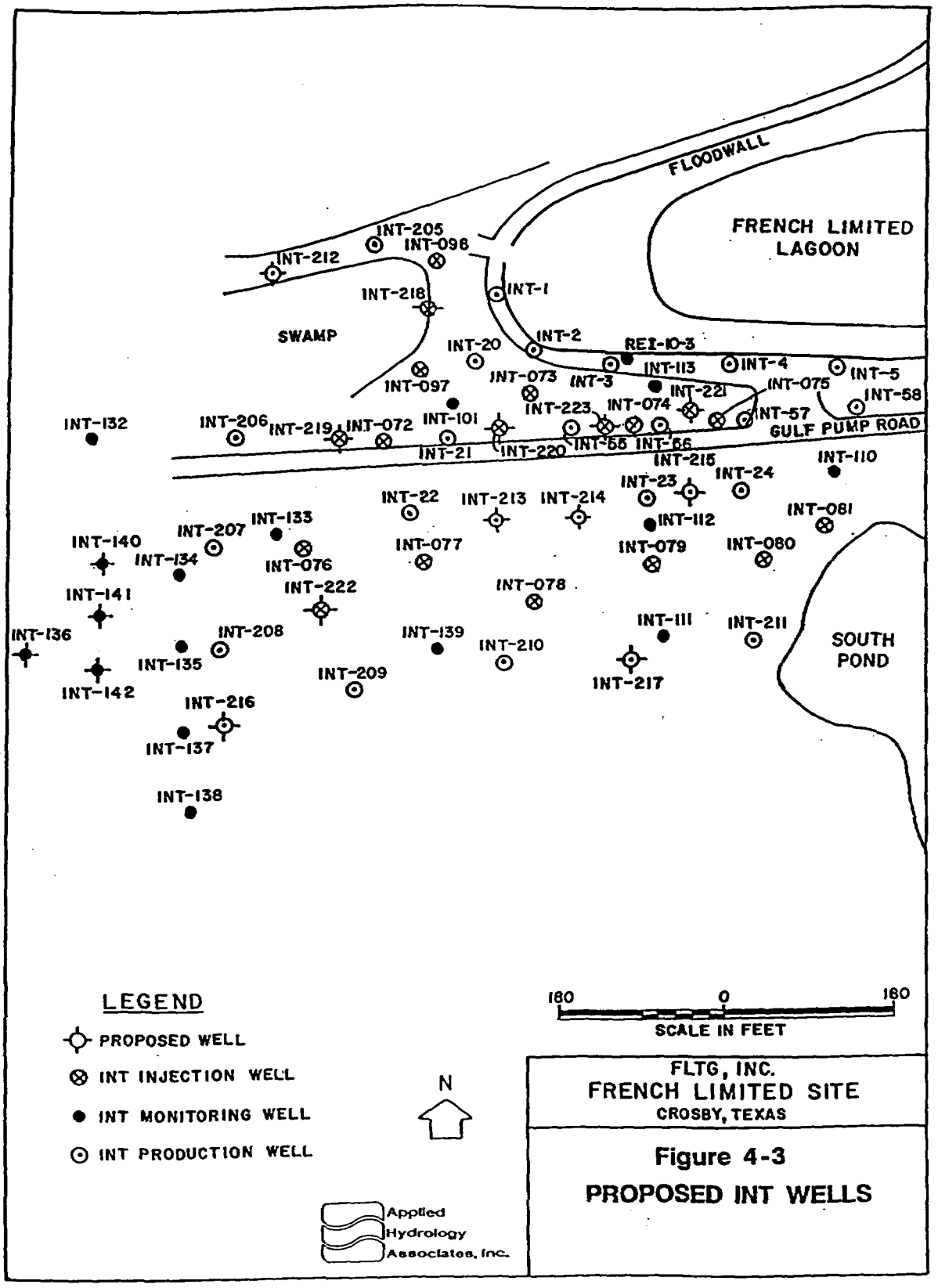
HSA: hollow-stem auger

MR: mud rotary

WR: *wet rotary (no drilling mud used)*

WR/TC: wet rotary with temp. casing to C1 to maintain circulation

INT injection wells have a minimum 6-ft separation between the base of the S1 unit and the top of the filter pack


FLOODWALL
FRENCH LIMITED LAGOON
SWAMP
SOUTH POND
GULF PUMP ROAD
INT-205
INT-098
INT-212
INT-218
INT-1
INT-2
INT-20
REI-10-3
INT-113
INT-4
INT-5
INT-097
INT-073
INT-3
INT-221
INT-075
INT-58
INT-223
INT-074
INT-57
INT-132
INT-206
INT-219
INT-072
INT-101
INT-21
INT-220
INT-55
INT-56
INT-215
INT-110
INT-23
INT-24
INT-22
INT-213
INT-214
INT-081
INT-112
INT-133
INT-207
INT-140
INT-134
INT-076
INT-077
INT-079
INT-080
INT-141
INT-222
INT-078
INT-136
INT-208
INT-139
INT-111
INT-211
INT-135
INT-210
INT-142
INT-209
INT-217
INT-216
INT-137
INT-138
LEGEND
PROPOSED WELL
INT INJECTION WELL
INT MONITORING WELL
INT PRODUCTION WELL
N
160
0
160
SCALE IN FEET
Applied Hydrology Associates, Inc.
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
Figure 4-3
PROPOSED INT WELLS

Baseline samples were collected from the four new INT monitoring wells in the Riverdale subdivision (INT-136, -140, 141, and -142) on April 4. Results were received on April 11. The results indicated that the VOC plume in this area, characterized by vinyl chloride, extends to wells INT-136, -141, and -142 (see Figure 4-4). In order to further define the extent of the western VOC plume in this area, a further three INT unit monitoring wells (INT-144, -145, and -146) were installed in April. Well installation followed the procedures described in *Work Plan for Soil Borings and Well Installation*[1]. Well locations are shown on Figure 4-4.

4.3.3 Eastern Area Well Installation

The above well installation program is combined with a program for additional injection and production wells in the S1-13 and S1-16 areas, outside the floodwall. The purpose of these wells is to enhance bioremediation rates in the VOC plumes that were defined by the DNAPL study in these two areas. Wells were all installed and six S1 injection wells were on line by the end of the month. Progress to the month end is summarized in Table 4-7. Well locations are shown on Figures 4-5 and 4-6.

4.3.4 S1 Unit Pulse Pumping

Pulse pumping continued at selected S1 unit production wells which are close to cleanup criteria. The pulse pumping schedule is weekly and started on January 24. The current pulse pumping program, which includes wells S1-23, -33, -34, -36, 37, -38, and -42 is shown in Table 4-8. Wells S1-35 and S1-43 have been taken off line since they did not show bounceback effects. Results of the first and second sampling sets since pulse pumping started were encouraging: VOCs were either not detected or were below cleanup criteria.

The speed of cleanup under pulse pumping is attributed to the high vertical hydraulic gradients created (up to 1 ft/ft), which increase flushing significantly compared with the typical horizontal gradients (up to 0.2 ft/ft) established by the remediation system. This lends support to setting up pulse-pumping domains in other areas of the S1 unit now, rather than only at specific production wells that are nearing cleanup criteria. In addition, remediation of the INT unit may be enhanced by pulse pumping with periodic dewatering.

4.4 Operational Refinements

During April, nutrient and oxygen delivery rates were increased as described in Section 4.2. Newly installed S1 and INT unit injection wells were placed on line as described in Section 4.1.1.

[1] Applied Hydrology Associates, Inc., March 1994

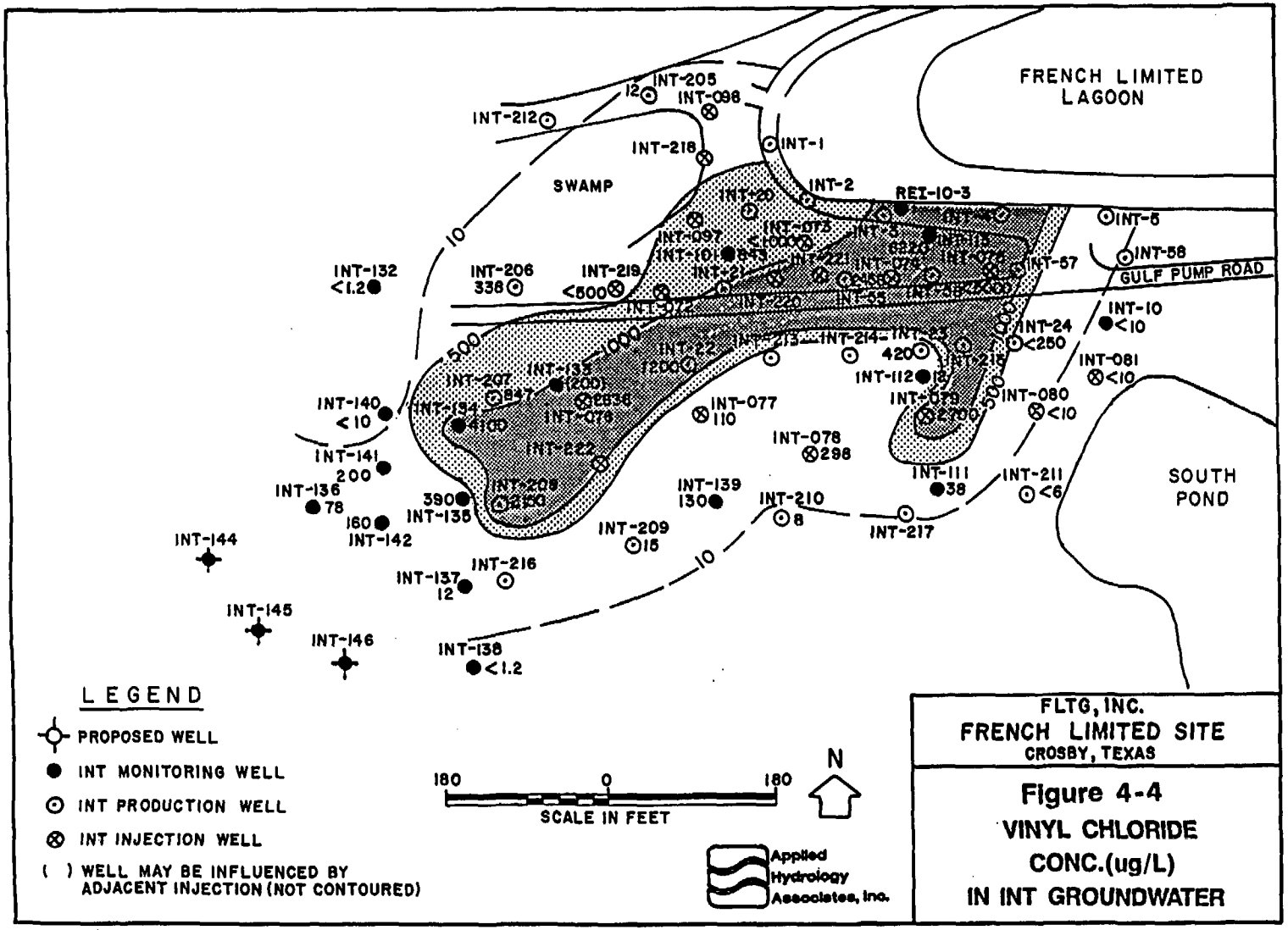
Table 4-8

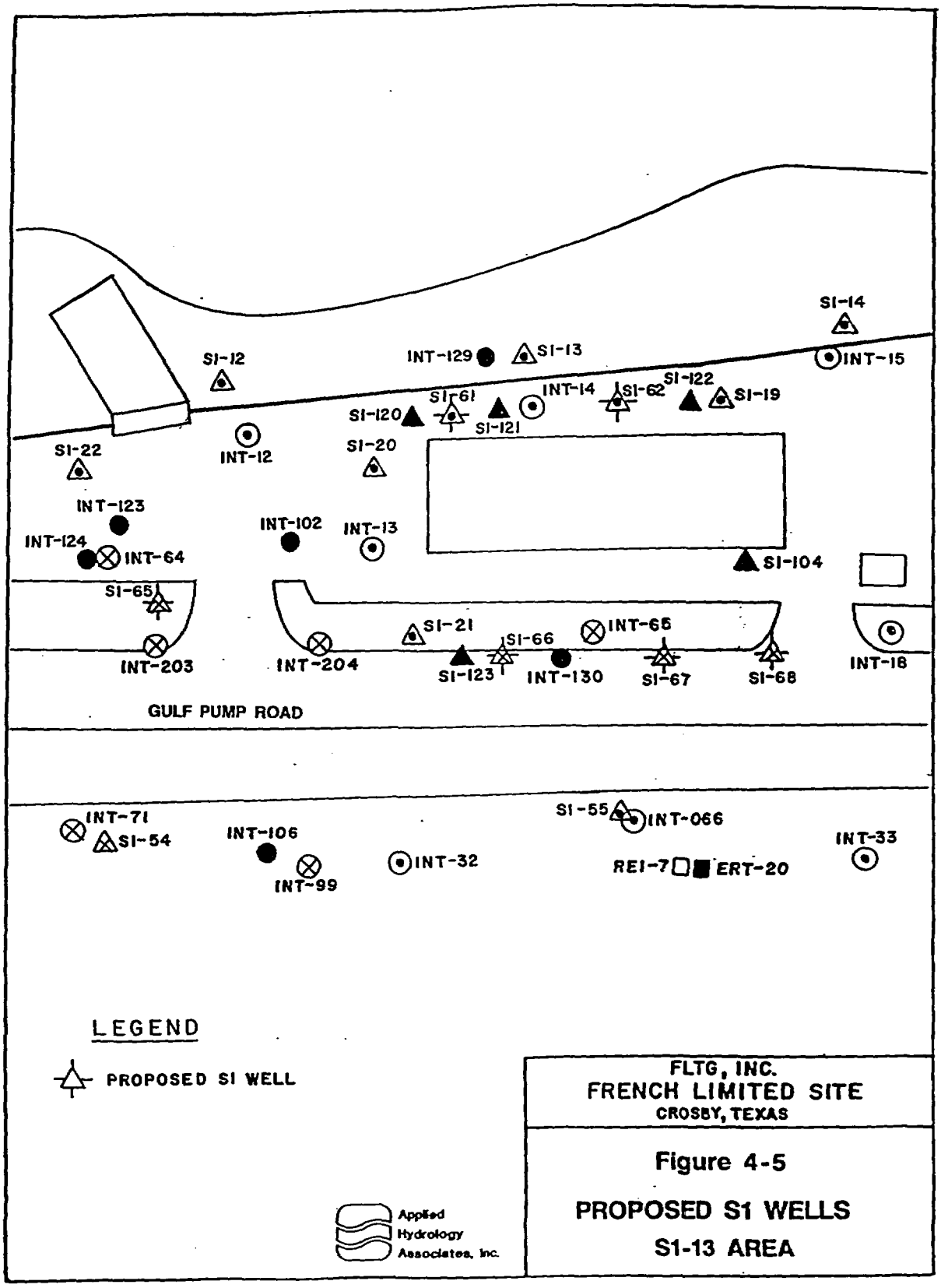
PULSE PUMPING PROGRAM

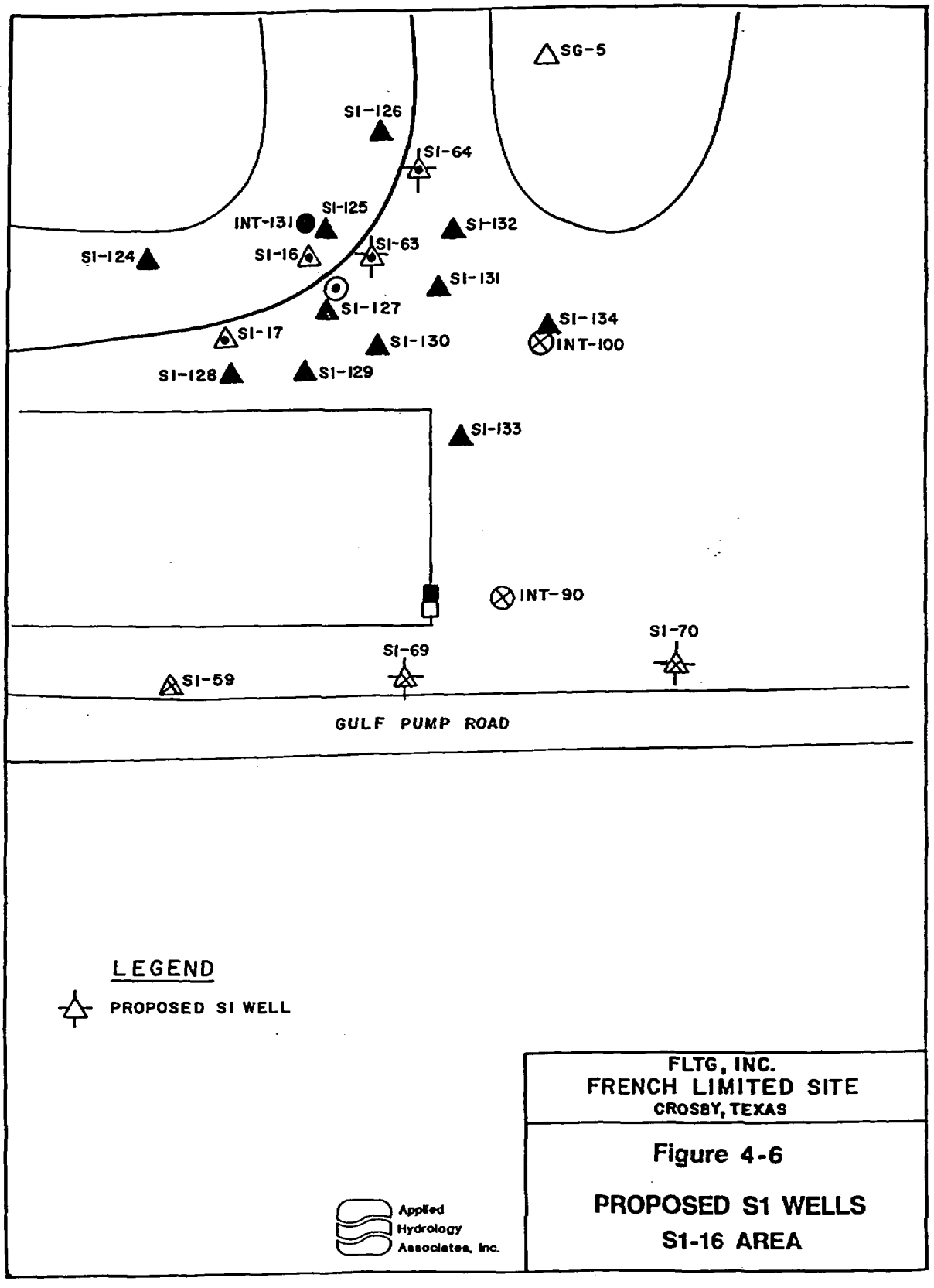
Date	S1-23, 38, 42	S1-33, 34, 36, 37	Sampling	Results
1/3/94	ON	ON	No Sampling	
1/10/94	ON	ON	No Sampling	
1/17/94	ON	ON	No Sampling	
1/24/94	OFF	OFF	Water levels only	
1/31/94	ON	ON	No Sampling	
2/7/94	ON	OFF	No Sampling	
2/14/94	OFF	ON	S1-33, 34, 36, & 37	Met criteria
2/21/94	ON	OFF	S1-23, 38, & 42	Met criteria
2/28/94	OFF	ON	No Sampling	
3/7/94	ON	OFF	No Sampling	
3/14/94	OFF	OFF	No Sampling	
3/21/94	OFF	ON	S1-33, 34, 36, & 37	Met criteria
3/28/94	ON	OFF	S1-23, 38, & 42	Met criteria
4/4//94	OFF	ON	No Sampling	
4/11/94	ON	OFF	No Sampling	
4/18/94	OFF	ON	S1-33, 34, 36, & 37	
4/25/94	ON	OFF	S1-23, 38, & 42	
5/2/94	OFF	ON	No Sampling	
5/9/94	ON	OFF	No Sampling	
5/16/94	OFF	ON	No Sampling	
5/23/94	ON	OFF	No Sampling	
5/30/94	OFF	ON	No Sampling	
6/6/94	ON	OFF	No Sampling	
6/13/94	OFF	ON	No Sampling	
6/20/94	ON	OFF	No Sampling	
6/27/94	OFF	ON	No Sampling	
7/4/94	ON	OFF	No Sampling	
7/11/94	OFF	ON	No Sampling	
7/18/94	ON	OFF	No Sampling	

Samples were collected on the weeks shown, at the start of the ON cycle; samples were collected after running well pump for 1 hour, and analyzed for VOCs only.

Figure 4-4




SI-14
INT-15
SI-12
INT-129
SI-13
SI-122
SI-19
SI-62
INT-14
SI-61
SI-120
SI-121
SI-22
INT-12
SI-20
INT-123
INT-124
INT-64
INT-102
INT-13
SI-104
SI-65
INT-203
INT-204
SI-21
SI-66
INT-65
SI-123
INT-130
SI-67
SI-68
INT-18
GULF PUMP ROAD
INT-71
SI-54
INT-106
INT-99
INT-32
SI-55
INT-066
INT-33
REI-7
ERT-20
LEGEND
PROPOSED SI WELL
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
Figure 4-5
PROPOSED S1 WELLS
S1-13 AREA
Applied Hydrology Associates, Inc.


SG-5
SI-126
SI-64
SI-125
INT-131
SI-132
SI-124
SI-16
SI-63
SI-131
SI-127
SI-134
SI-17
SI-130
INT-100
SI-128
SI-129
SI-133
INT-90
SI-70
SI-69
SI-59
GULF PUMP ROAD
LEGEND
PROPOSED SI WELL
FLTG, INC.
FRENCH LIMITED SITE
CROSBY, TEXAS
Figure 4-6
PROPOSED S1 WELLS
S1-16 AREA
Applied Hydrology Associates, Inc.

4.5 Data Summary and Discussion

4.5.1 Groundwater Production and Injection

Groundwater production and injection rates are on target (see Table 4-1). Higher production and injection rates are expected next month when five new INT production wells, six new INT injection wells, four new S1 production wells, and six new S1 injection wells come on line.

4.5.2 Groundwater Levels and Flow Directions

Water level readings for the S1 and INT units were measured on April 5. Regional groundwater elevation contours for the S1 and INT units in the groundwater remediation area are presented in Figures 4-7 and 4-8. These figures also show the baseline (December 1991) extent of groundwater contamination. The current extent of contaminated groundwater is contained within the S1 and INT extraction system capture zones.

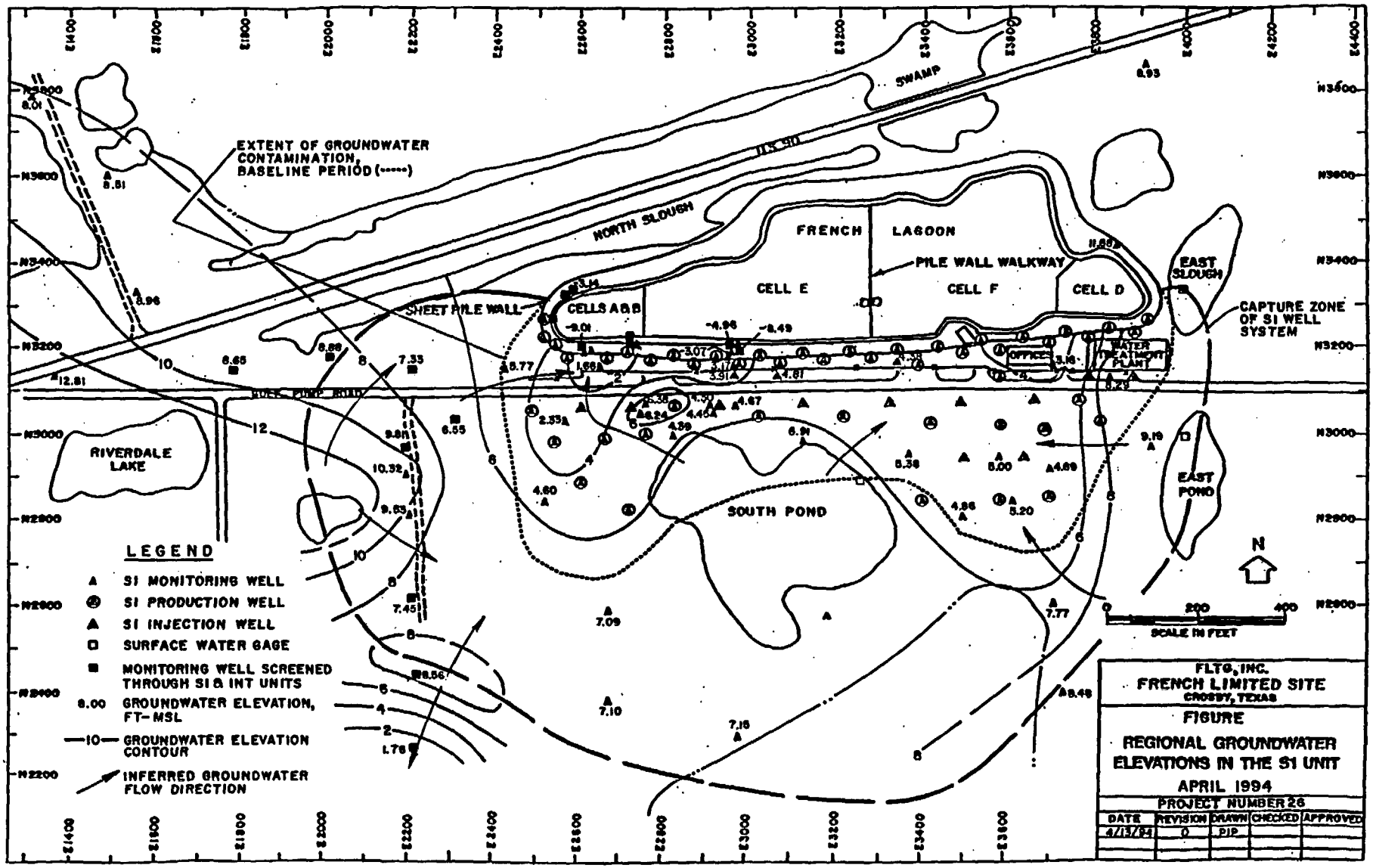
4.5.3 TOC in shallow groundwater

Samples were collected from all 99 production wells on April 2 and 3 for on-site TOC analysis. Summaries of TOC concentrations from the start of remediation to date for each unit are presented in Tables 4-9 and 4-10. TOC contour maps are presented in Figures 4-9 and 4-10. The history of daily flows, TOC concentration, and TOC input to T-101 is presented in Table 4-2. On-site TOC analyses (used to generate Tables 4-2, 4-9, and 4-10) measure non-purgeable organic carbon.

4.5.4 In-Situ Bioremediation

Apart from the increases in oxygen and nutrient delivery described in Section 4.2, no major changes in in-situ bioremediation system operation or response occurred in April. The emphasis continues to be to maximize delivery of oxygen and nutrients to the INT system. The additional INT wells installed in the western area should assist in this goal. Oxygen delivery continues to be evidenced by higher-than-ambient DO concentrations at certain monitoring wells (see Figures 4-11 and 4-12), but is not yet widespread over the shallow aquifer.

Figure 4-7



79366

Figure 4-8

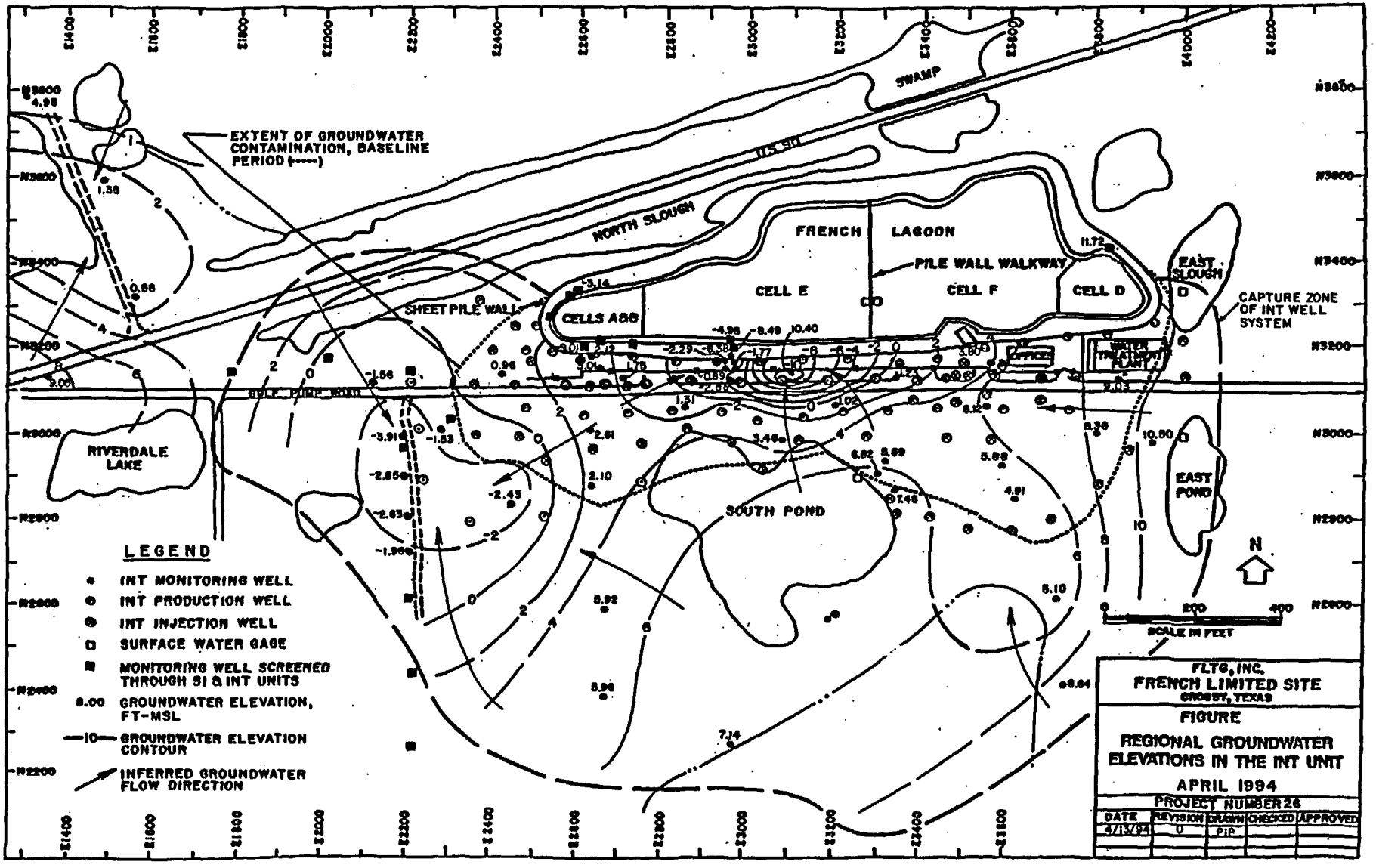


Table 4-9

HISTORY OF TOC CONCENTRATIONS
AT S1 PRODUCTION WELLS

Well ID	Baseline Nov-Dec 91 (ppm)	Maximum Feb-Dec 92 (ppm)	Minimum 1993 (ppm)	Maximum 1993 (ppm)	Average 1993 (ppm)	Jan 1994 (ppm)	Feb 1994 (ppm)	Mar 1994 (ppm)	Apr 1994 (ppm)
S1-1	290	475	390	910	634	1025	1150	1317	941
S1-2	190	796	460	1204	832	1037	909	1510	982
S1-3	370	1071	384	1610	862	1090	1120	1037	793
S1-4	47	866	560	1044	786	848	1300	1025	676
S1-5	51	646	548	950	714	1079	624	1151	655
S1-6	51	800	482	1084	816	1202	1340	1315	832
S1-7	200	787	710	1084	879	NS	1290	1327	857
S1-8	64	927	465	1072	769	1118	1290	1516	921
S1-9	77	506	225	1530	830	1809	2020	2085	1500
S1-10	46	214	147	2105	1381	2251	2610	2540	1716
S1-11	120	281	270	1848	1193	2004	2210	NS	1500
S1-12	140	1002	585	2260	1200	2313	2390	2129	1780
S1-13	520	894	404	760	598	771	930	990	698
S1-14	590	1730	626	2304	1214	1502	1077	1616	1350
S1-15	5300	4910	336	3696	2374	3373	2756	2778	3030
S1-16	8900	8900	160	3122	1651	NS	2056	2732	2,256
S1-17	6800	5550	405	1106	750	627	388	344	314
S1-18	2200	2043	52	196	112	90	101	44	86
S1-19	20	914	53	220	110	26	37	33	60
S1-20	120	1360	60	192	126	25	95	141	57
S1-21	65	418	23	1020	134	113	48	17	29
S1-22	290	1080	8	1010	123	12	6	4	28
S1-23	350	234	7	1315	137	24	14	27	29
S1-24	250	240	16	200	52	25	16	16	39
S1-25	550	660	11	91	35	26	16	16	28
S1-26	540	575	14	84	34	25	25	22	39
S1-27	220	219	52	400	119	51	62	60	52
S1-28	370	520	11	380	64	275	29	12	23
S1-29	670	496	16	182	47	50	62	23	28
S1-30	370	711	27	604	113	51	50	78	38
S1-31	14	712	15	70	34	0	57	29	60
S1-32	18	347	30	910	185	100	132	85	82
S1-33	10	30	12	55	30	101	99	16	25
S1-34	11	50	24	94	50	79	90	75	24
S1-35	24	154	22	95	68	25	43	45	64
S1-36	200	162	10	106	56	60	49	44	45
S1-37	13	71	12	180	44	50	52	55	57
S1-38	59	73	1	52	21	NS	1540	6	17
S1-39	290	414	17	96	35	15	25	22	21
S1-40	150	210	25	268	70	38	25	33	25
S1-41	170	116	14	84	31	1	48	12	17
S1-42	88	103	5	35	17	0	11	37	13
S1-43	4	36	6	50	24	1	21	NS	19
S1-44	280	204	9	45	25	25	19	44	33
S1-45	4400	588	14	174	51	37	20	30	33
S1-46	480	462	4	76	18	1	11	10	21
S1-47	1200	1390	25	155	79	150	72	61	60
S1-48	1200	1505	15	133	52	50	34	31	31
S1-60	48	91	8	126	28	25	11	15	16

NS = Not Sampled

Table 4-10

HISTORY OF TOC CONCENTRATIONS
AT INT PRODUCTION WELLS

Well ID	Baseline Nov-Dec 91 (ppm)	Maximum Feb-Dec 92 (ppm)	Minimum 1993 (ppm)	Maximum 1993 (ppm)	Average 1993 (ppm)	Jan 1994 (ppm)	Feb 1994 (ppm)	Mar 1994 (ppm)	Apr 1994 (ppm)
INT-1	3600	3600	460	1584	1029	1050	718	800	608
INT-2	1800	1120	215	900	414	174	230	290	301
INT-3	5200	2030	218	1935	1389	2080	1926	1188	1362
INT-4	610	928	330	793	526	587	1300	1300	990
INT-5	960	1689	190	536	356	263	248	205	159
INT-6	280	973	90	1140	556	720	451	510	312
INT-7	100	245	24	1100	308	99	74	99	104
INT-8	75	666	24	196	90	112	103	84	87
INT-9	800	1413	101	358	178	188	174	142	105
INT-10	1900	1328	57	186	109	100	93	112	98
INT-11	590	1816	80	171	117	175	186	NS	85
INT-12	3300	1820	141	1255	399	364	239	106	123
INT-13	590	924	40	251	122	99	67	63	50
INT-14	24	1026	58	492	266	226	154	112	162
INT-15	19	1760	9	38	20	12	34	20	19
INT-16	2000	2230	6	147	28	13	12	15	13
INT-17	7	252	39	184	81	152	25	13	15
INT-18	4	129	139	270	183	225	230	162	137
INT-19	1400	1800	52	332	158	112	76	55	55
INT-20	3500	3742	901	3141	2123	2147	1960	2525	1844
INT-21	29	301	130	325	260	362	327	240	217
INT-22	8	68	18	76	45	43	58	55	32
INT-23	16	74	43	112	73	48	53	40	32
INT-24	240	434	38	472	293	202	174	136	111
INT-25	36	376	58	272	169	75	60	65	62
INT-26	120	970	143	837	430	203	173	152	131
INT-27	180	324	107	268	196	75	109	116	104
INT-28	630	648	57	288	200	187	80	48	51
INT-29	1100	1120	74	450	245	162	130	104	58
INT-30	1400	606	43	294	129	112	60	32	28
INT-31	70	540	29	120	62	12	67	52	41
INT-32	880	470	48	208	119	124	26	16	29
INT-33	120	1710	25	1620	910	1374	1006	255	109
INT-55	NS	NS	53	53	53	235	113	115	76
INT-56	NS	NS	668	668	668	901	824	925	153
INT-57	NS	NS	28	28	28	12	29	40	24
INT-58	NS	NS	102	102	102	10	94	76	67
INT-59	NS	NS	121	121	121	100	104	115	81
INT-60	NS	NS	172	172	172	201	169	195	151
INT-61	NS	NS	56	56	56	79	80	95	54
INT-62	NS	NS	52	52	52	75	197	100	65
INT-66	NS	NS	114	114	114	125	132	175	161
INT-205	NS	NS	31	31	31	39	132	120	50
INT-206	NS	NS	24	24	24	218	48	44	45
INT-207	NS	NS	66	66	66	101	71	56	58
INT-208	NS	NS	27	27	27	19	53	20	24
INT-209	NS	NS	35	35	35	40	62	52	51
INT-210	NS	NS	36	36	36	42	48	24	29
INT-211	NS	NS	109	109	109	151	127	88	89

NS = Not Sampled

Figure 4-9

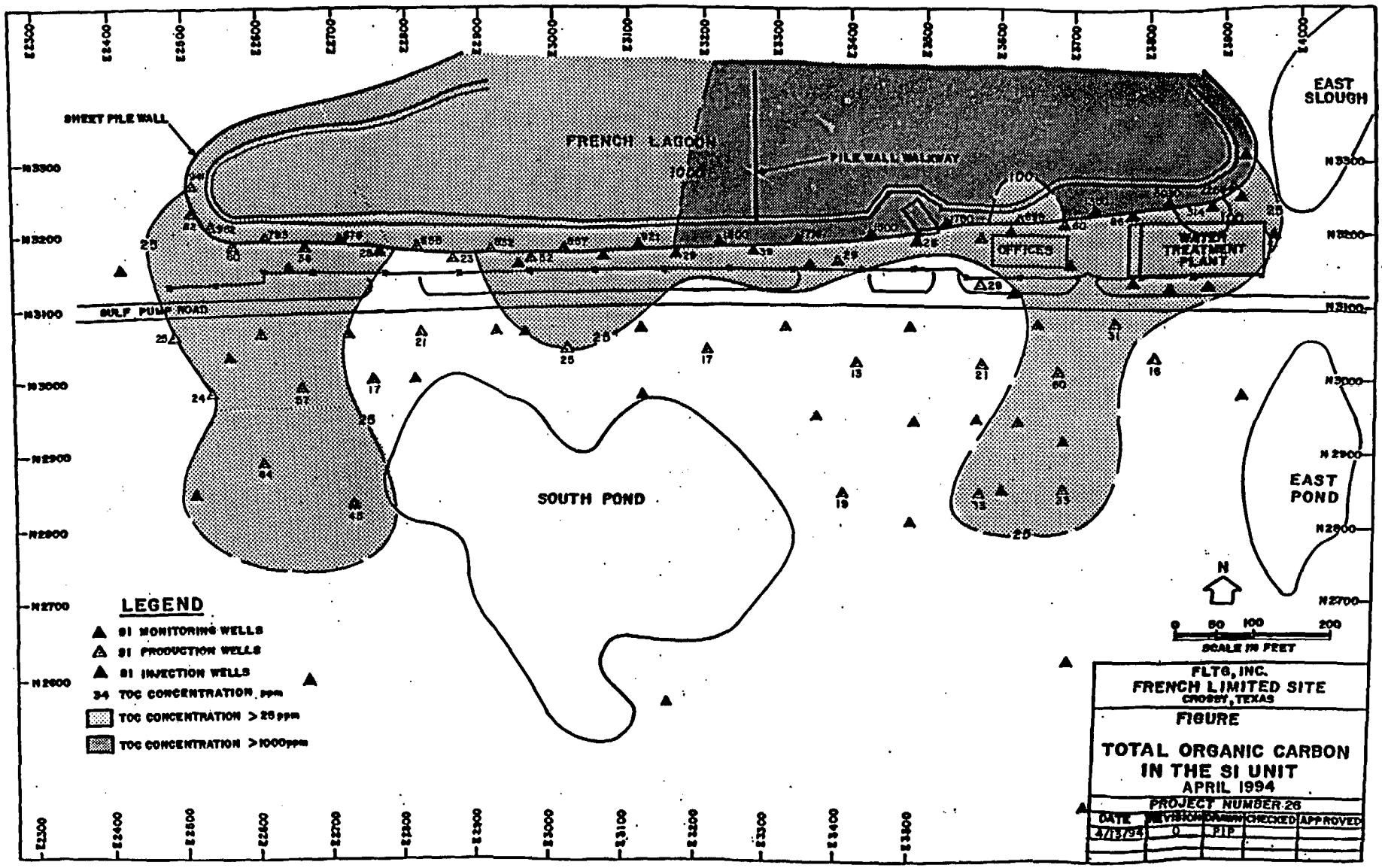


Figure 4-10

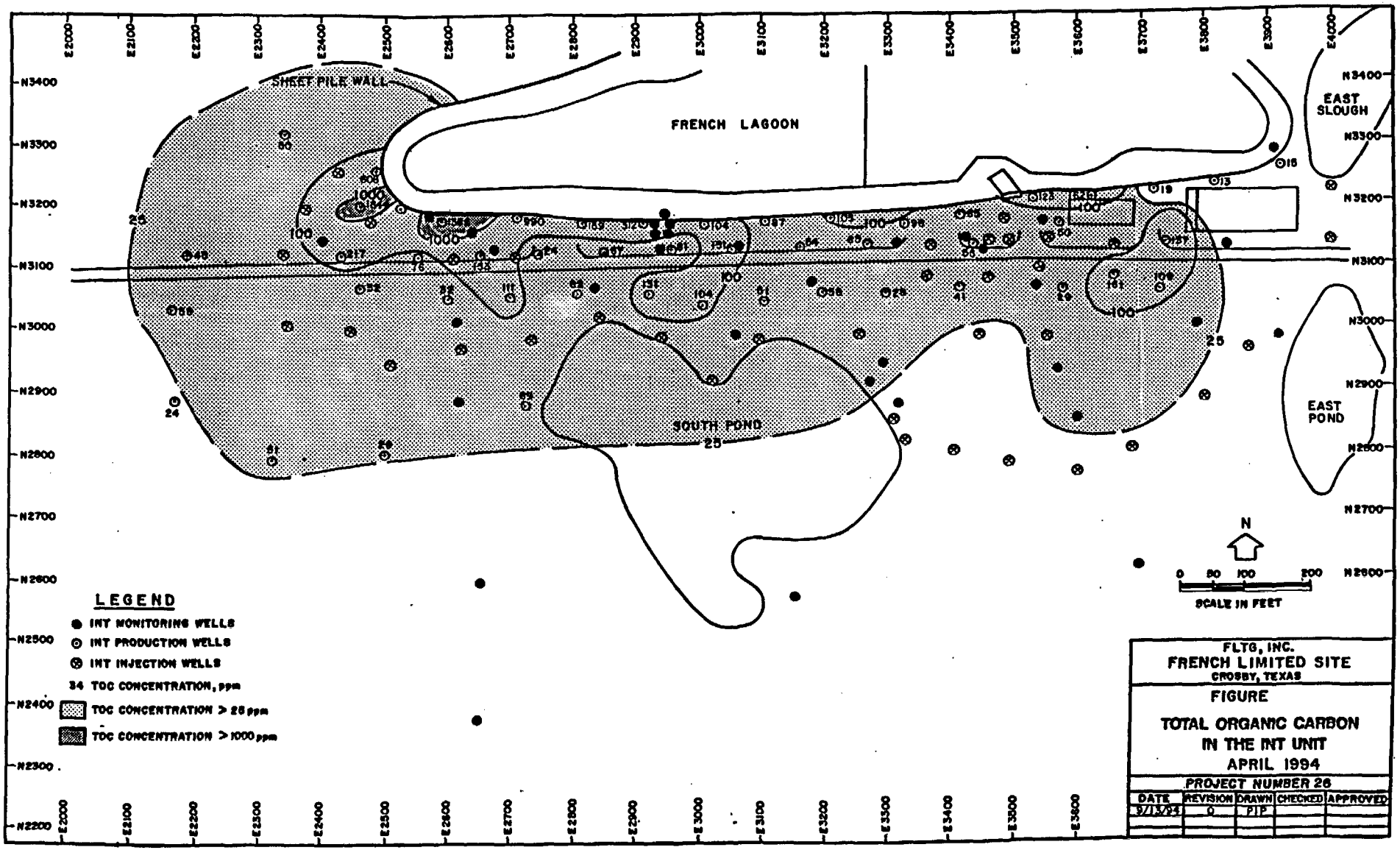


Figure 4-11

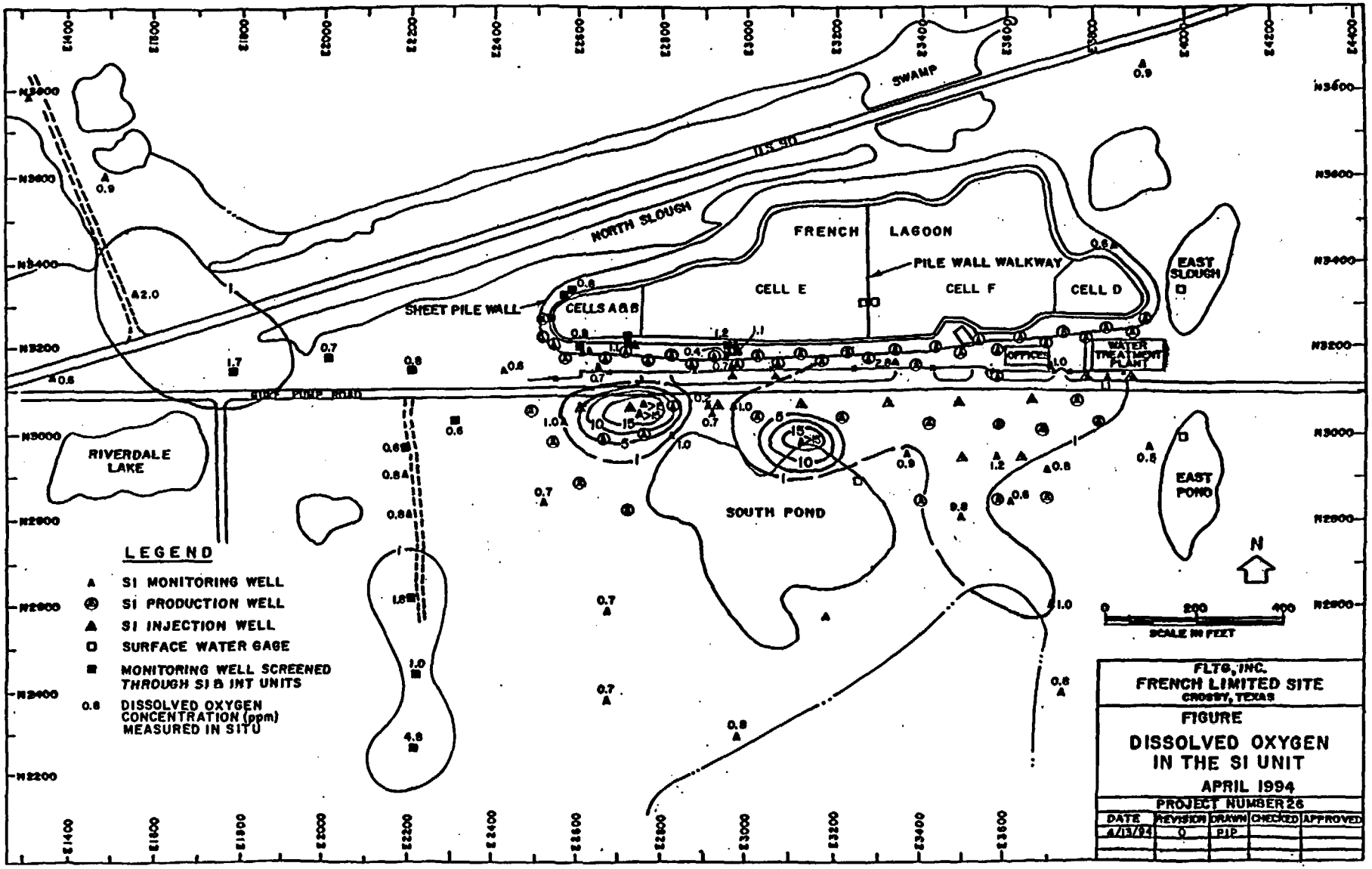
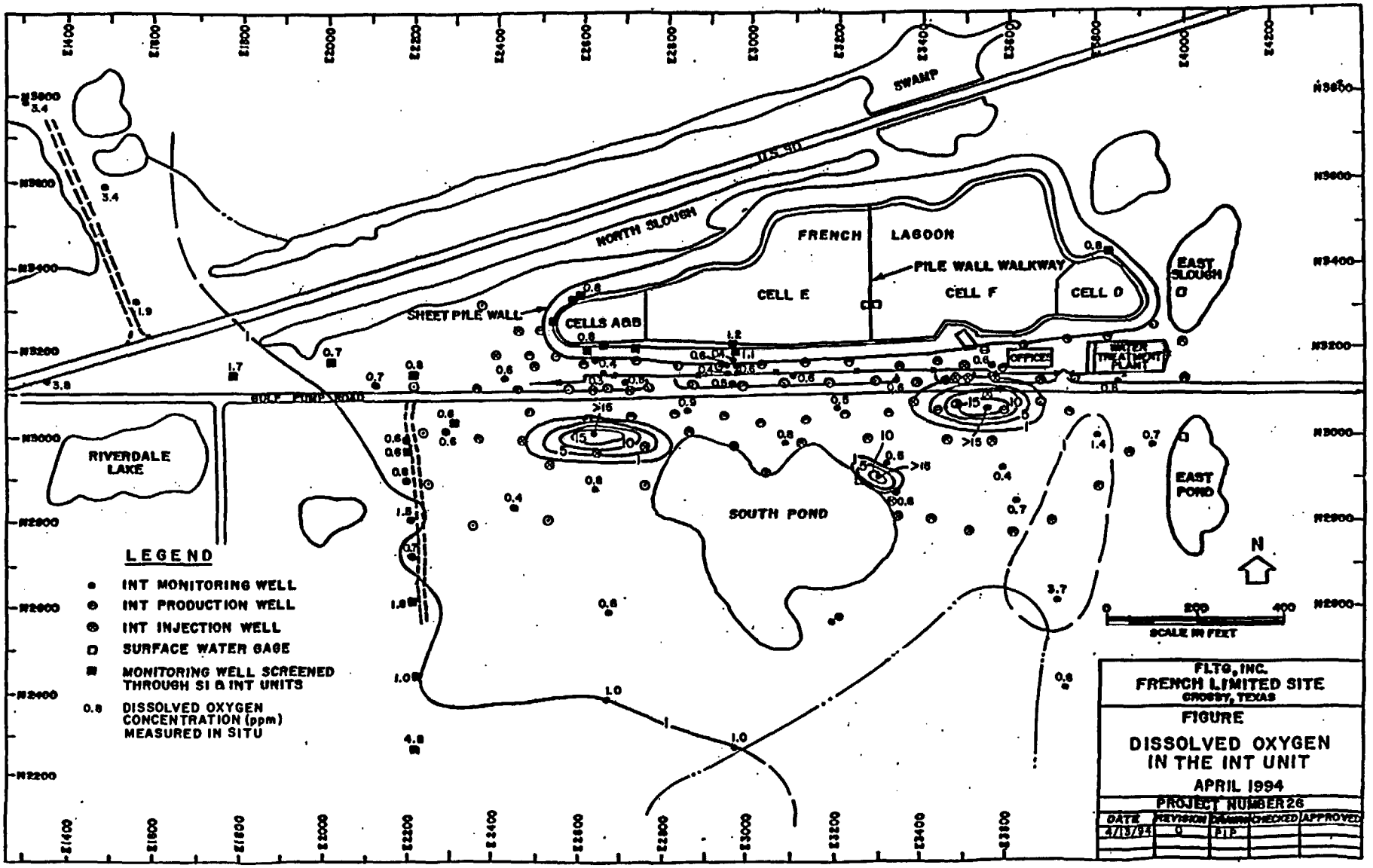


Figure 4-12



4.6 Schedule

Development and sampling of the three new INT unit monitoring wells in the Riverdale subdivision will be completed in early May. The DNAPL Study Risk Evaluation and Feasibility Study Reports will be completed in early May. Additional well development at low flow wells will be performed in May.

ATTACHMENT 4A

Production and Injection Flow Calculations

ATTACHMENT 4A

Production and Injection Flow Calculations

Introduction

The March 25, 1994 Independent Quality Assurance Team (IQAT) report, Aquifer Remediation sections raised questions regarding the calculation of injection rates reported in the November 1993, December 1993, January 1994, and February 1994 Monthly Progress Reports. This attachment explains how production and injection flows are calculated.

Metering Systems

Production and injection flows are measured based on two sets of data:

1. Total flow meter readings
2. Individual well flow meter readings

Total flow rates are derived from daily readings of totalizing meters on the production and injection headers located at the groundwater treatment plant. Weekly readings of individual well totalizing meters are performed at each production or injection well.

The primary purpose of the weekly individual well readings is to verify that wells are operating correctly, and to track changes in flow rates. Changes in flow rates at an individual well may indicate pump or meter blockage, or reduction in well efficiency, which would require an operational response. The weekly individual well readings are also used to calculate the amount of water flowing into or out of each aquifer unit, and into or out of subareas within each aquifer unit, if required. This is required because production and injection headers are not dedicated to specific aquifer units.

However, the individual well flow readings are not used directly to determine flows into or out of each aquifer unit, and into or out of subareas within each aquifer unit. Because small totalizing flow meters are generally considered less accurate than large totalizing flow meters, a correction to the individual well flow meters is performed, using the main flow meters as the control. First, the total production and injection flows for the month are calculated, as tabulated each month in Tables 4-2 and 4-3. Secondly, the individual well flows are calculated based on the weekly totalizing flow meter readings, as tabulated in Table 4-4. Thirdly, the total production or injection flow is apportioned by aquifer unit or area, as required, based on the relative flow rates from the individual well flow readings. Three examples of calculations from the April 1994 monthly progress report data follow.

Examples of Production and Injection Flow Calculations

Example 1 - Calculation of Production Flows by Aquifer Unit

Average production flow, main meter (Table 4-2) = 163 gpm
Average S1 unit production, individual well meters (Table 4-4) = 115.2 gpm
Average INT unit production, individual well meters (Table 4-4) = 43.8 gpm
Average S1 + INT unit production, individual well meters (Table 4-4) = 159 gpm
Required correction to individual well flows = 163/159 = 102.5%
Corrected S1 unit production = 115.2 x 102.5% = 118.08 ≅ 118 gpm (Table 4-1)
Corrected INT unit production = 43.8 x 102.5% = 44.90 ≅ 45 gpm (Table 4-1)

Example 2 - Calculation of Injection Flows by Aquifer Unit

Average injection flow, main meters (Table 4-3) = 103 gpm
Average S1 unit injection, individual well meters (Table 4-4) = 40.1 gpm
Average INT unit injection, individual well meters (Table 4-4) = 56.2 gpm
Average S1 + INT unit injection, individual well meters (Table 4-4) = 96.3 gpm
Required correction to individual well flows = 103/96.3 = 107.0%
Corrected S1 unit injection = 40.1 x 107.0% = 42.91 ≅ 43 gpm (Table 4-1)
Corrected INT unit injection[2] = 56.2 x 107.0% = 60.13 ≅ 60 gpm (Table 4-1)

Example 3 - Calculation of Nutrient Injection Rate

This calculation is more complex for April 1994, due to the changeover from 4.67% KNO_3 nutrient solution to 9% KNO_3 solution on April 17. Daily quantities of nutrients used are recorded in FLTG's Daily Operations Report.

Average 4.67% KNO_3 flow = 13,130 gallons/17.5 days = 750 gpd (Table 4-1)
Average 9% KNO_3 flow = 4,211 gallons/11.5 days = 366 gpd (Table 4-1)
Average flow to INT, & S1-58/59, individual well meters (Table 4-4) = 62.2 gpm
Corrected flow to INT, & S1-58/59 = 62.2 x 107.0% = 66.55 gpm
Percent 4.67% KNO_3 flow rate = 750/(66.55 x 1440) = 0.78% (Table 4-1)
Percent 9% KNO_3 flow rate = 366/(66.55 x 1440) = 0.38% (Table 4-1)

[2] Note that "INT unit injection" includes a component of injection into the S1 unit at those INT injection wells that experience surface leaks.

Changes to Production and Injection Header Systems

At the start of remediation, the production header system connected S1 and INT wells, and was divided into subsystems by area, as follows:

System 1 - South of Gulf Pump Road, west
System 2 - South of Gulf Pump Road, east
System 3 - Inside flood wall, west
System 4 - Inside flood wall, east
System 5 - North of Gulf Pump Road, west
System 6 - North of Gulf Pump Road, east

New production wells were added to the appropriate header depending on the area in which they were installed. Flows from south of Gulf Pump Road were recorded by meter FQ-901. Flows from north of Gulf Pump Road were recorded by meter FQ-902. These meters always over-reported flows relative to meter FQ-101A (Tank T-101 outflow), the latter meter being assumed more reliable as it was not affected by trapped air from the original pneumatic pumps.

At the start of remediation, the injection header system was divided into S1 and INT unit injection headers, with two additional headers to supply the S1 test area south of Gulf Pump Road, and the INT test area north of Gulf Pump Road. Flows to all S1 wells were recorded by meter FQ-905, and flows to all INT wells were recorded by meter FQ-906. Both units were supplied with oxygen- and nutrient-amended potable water upstream of the S1-INT header split.

During 1993, quarterly monitoring results showed that the S1 unit outside the floodwall had reached cleanup criteria for all compounds except benzene, in all areas except those close to the known DNAPL areas at S1-13 and S1-16. As aerobic, rather than nitrogen-reducing conditions, are preferred for benzene breakdown, it was decided to set up a separate nutrient injection system for the INT unit, and stop nutrient injection to the S1 unit. However, before this decision had been finalized - during June, July, and September, 1993 - 33 additional INT injection wells (22 south of Gulf Pump Road[3]) were added to the system, and, for expediency, those south of Gulf Pump Road were tied into the S1 test injection line. Hence, after the nutrient system change was completed, on October 22, 1993, the main flow meters supplied injection wells as follows:

FQ-905 - "S1" - all S1 injection wells, plus all INT injection wells south of Gulf Pump Road, and wells INT-90 and INT-100 north of Gulf Pump Road

FQ-906 - "INT" - all INT injection wells north of Gulf Pump Road other than INT-90 and INT-100

[3] See *Well Installation Report, 1993*. Applied Hydrology Associates, January 1994.

This led to an over-reporting of "S1 injection" flows in Tables 4-1 and 4-2 and Figures 4-1 and 4-2 of the November and December 1993 Monthly Progress Reports, as the main meter for the S1 unit was also recording flows to many INT injection wells. However, this inaccuracy was corrected by performing the type of calculations described above, and the individual aquifer unit injection flows presented in Sections 4.1.1.1 and 4.1.1.2 of these reports showed these corrections. In addition, the legend for Figures 4-1 and 4-2 indicated that the "S1 Injection" flows included the new INT wells, i.e., those south of Gulf Pump Road.

On January 4, 1994, an additional flow meter, FQ-909, was added to the injection header system to record the flow to S1 wells south of Gulf Pump Road. As shown in Monthly Progress Reports for January 1994 onwards, this allowed main meter flows to be determined as follows:

FQ-905 minus FQ-909 - "S1" - all S1 injection wells, except S1-58 and S1-59

FQ-906 - "INT-North" - all INT injection wells north of Gulf Pump Road, plus S1-58 and S1-59

FQ-909 - "INT-South" - all INT injection wells south of Gulf Pump Road

This procedure was described incorrectly in Table 4-2, Figure 4-2, and Section 4.1.3 of the January 1994 Monthly Progress Report, but was corrected in Table 4-2 and Figure 4-2 of the February 1994 and subsequent Monthly Progress Reports.

5.0 GROUNDWATER TREATMENT PLANT

5.1 Summary of Activities

In the report for March, 1994 operations reported that the carbon filter blending system was activated early in the month in a manual position. On April 1, 1994 the valve positioner was placed in automatic mode with the analyzer set at 52 mg/L. With the low concentration of influent T.O.C. and excellent performance of the clarifier and sand filters, the seven major standards and pH were well within the 30 day averaging criteria while 55% of the treated water bypassed the carbon filters. The plant treated and blended water the entire month of April without a carbon transfer at a savings of $36,000.

Unfortunately, metals analysis resulted in excursions for copper and silver during April. On April 20 results were received for the composite of April 11 which showed elevated Cu and Ag. A grab sample was taken from the 11-37-0 fertilizer grade nutrient storage as it was the likely source of the metals. The Attachment 5A reveals the results so the fertilizer grade was replaced with technical grade Diammonium Phosphate for R_1 and R_2 bioreactor nutrient on April 22.

Records show the project received the load of fertilizer on March 17 and started injecting the same on March 21. Operations are copntinuing to purge the system of the metals. Grab samples show a dramatic decline but 30 day average is still elevated through the last reporting period of April.

Operations will continue to use the technical grade nutrient until the supplier of the 11-37-0 can confirm that the metals concentration in their product can be tolerated.

There have been no major mechanical failures for the month of April.

Total flows for April:

Water discharged to the San Jacinto River - 8,152,810 gallons

Water discharged to the Lagoon - 0 gallons

Sludge discharged to the Lagoon - 38,850 gallons

Water processed through the GWT - 7,063,100 gallons

Water discharged to the South Pond - 0 gallons

Water processed from Cell F to GWT - 2,763,000 gallons (included in Attachment 5B)

Water blended passed Carbon Filter - 3,758,200 gallons

5.2 Inoculum/Nutrient Addition

The following have been introduced into the bioreactors/clarifier:

Nutrients:

820 gallons 11-37-0
120 gallons Monosodium Phosphate
150 gallons Diammonium Phosphate

Microbes:

16 oz. French Limited Isolated Microbes

Coagulant:

27 gallons Percol 778 Cationic Polymer

5.3 Maintenance

Table 5-1 lists the preventive maintenance items performed in April.

5.4 Operating Data

1. Operator logs and records are included in Appendix D.

2. Table 5-2 summarizes the laboratory analysis of the treated water discharged to the San Jacinto River.

TABLE 5-1

Preventive Maintenance

Day	Action
April 1	Electrical inspection completed.
April 4	Rotated Sala Pumps.
April 11	Rotated Sala Pumps. Lubed all equipment in GWT Plant. Lubed Sump Pump and Water Pump in Chemical Storage.
April 18	Rotated Sala Pumps.
April 25	Rotated Sala Pumps. Lubed all equipment in GWT Plant. Lubed Sump Pump in Chemical Storage. Lubed all "red" valves. Lubed all gate rollers. Lubed chain on electric gate.

TABLE 5-2
Treated Water Results Summary

Collected	Set No.	pH (6-9)		TSS 5 PPM		TOC 55 PPM		O&G 15 PPM		Benzene 150 PPB		Chlor HC's 500 PPB		Total PCBs 0.65 PPB		Napthalene 300 PPB	
		Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	R-Avg
17-Jan-94	M03A0203	7.79		1.05		9.		2.7		2.5		8.		.13		5.	
20-Jan-94	M03A0202	7.75		1.		6.1		2.7		2.5		8.		.13		5.	
24-Jan-94	M03A0204	7.6		2.		12.		2.7		2.5		19.		.13		5.	
27-Jan-94	M03A0205	7.5		1.		11.		2.7		2.5		16.		.13		5.	
31-Jan-94	M03A0206	8.02		2.1		6.2		2.8		2.5		50.		.13		5.	
3-Feb-94	M03A0207	7.6		1.		3.8		2.8		2.5		26.		.13		5.	
7-Feb-94	M03A0208	7.57		1.1		12.		2.15		2.5		19.		.13		5.	
10-Feb-94	M03A0209	7.98		2.		9.7		2.8		2.5		45.		.13		5.	
14-Feb-94	M03A0210	8.04	7.76	1.	1.36	3.8	8.18	2.8	2.68	2.5	2.5	37.	25.33	.13	.13	5.	5.
17-Feb-94	M03A0211	7.87	7.77	2.	1.47	4.2	7.64	2.15	2.62	2.5	2.5	15.	26.11	.13	.13	5.	5.
21-Feb-94	M03A0212	7.53	7.75	1.	1.47	8.6	7.92	2.15	2.56	2.5	2.5	21.	27.56	.13	.13	5.	5.
24-Feb-94	M03A0213	8.14	7.81	2.2	1.49	4.	7.03	2.8	2.57	2.5	2.5	19.	27.56	.13	.13	5.	5.
28-Feb-94	M03A0214	7.94	7.85	1.	1.49	4.8	6.34	2.8	2.58	2.5	2.5	19.	27.89	.13	.13	5.	5.
3-Mar-94	M03A0215	7.62	7.81	1.	1.37	8.1	6.56	2.8	2.58	2.5	2.5	50.	27.89	.13	.13	5.	5.
7-Mar-94	M03A0216	7.78	7.83	1.	1.37	10.	7.24	2.15	2.51	2.5	2.5	105.	36.67	.13	.13	5.	5.
10-Mar-94	M03A0217	7.73	7.85	2.	1.47	17.	7.8	2.7	2.57	2.5	2.5	122.	48.11	.13	.13	5.	5.
14-Mar-94	M03A0218	7.87	7.84	2.	1.47	3.3	7.09	2.8	2.57	2.5	2.5	26.	46.	.13	.13	5.	5.
17-Mar-94	M03A0219	7.75	7.8	1.	1.47	.5	6.72	2.8	2.57	2.5	2.5	14.	43.44	.13	.13	5.	5.
21-Mar-94	M03A0220	7.87	7.8	4.2	1.71	18.	8.26	2.8	2.64	2.5	2.5	243.	68.78	.13	.13	5.	5.
24-Mar-94	M03A0221	7.52	7.8	2.	1.82	20.2	9.54	2.95	2.73	2.5	2.5	78.	75.11	.13	.13	5.	5.
28-Mar-94	M03A0222	8.	7.79	1.	1.69	10.	10.21	2.8	2.73	2.5	2.5	77.	81.56	.13	.13	5.	5.
31-Mar-94	M03A0223	7.93	7.79	1.1	1.7	40.	14.12	2.8	2.73	2.5	2.5	520.	137.22	.13	.13	10.	5.56
5-Apr-94	M03A0224	7.76	7.8	3.	1.92	38.9	17.54	.5	2.48	2.5	2.5	48.	137.	.13	.13	5.	5.56
7-Apr-94	M03A0225	7.5	7.77	.5	1.87	35.6	20.39	2.5	2.52	2.5	2.5	465.	177.	.13	.13	5.	5.56
11-Apr-94	M03A0226	7.48	7.74	5.	2.2	46.4	23.66	2.5	2.49	2.5	2.5	474.	216.11	.13	.13	5.	5.56
14-Apr-94	M03A0227	7.79	7.73	4.	2.42	14.	24.84	2.5	2.46	2.5	2.5	58.	219.67	.13	.13	5.	5.56
18-Apr-94	M03A0228	7.61	7.72	2.	2.53	50.9	30.44	2.5	2.43	2.5	2.5	633.	288.44	.16	.13	5.	5.56
21-Apr-94	M03A0229	7.62	7.69	4.	2.51	52.5	34.28	2.5	2.39	2.5	2.5	530.	320.33	.16	.14	5.	5.56
25-Apr-94	M03A0230	7.62	7.7	4.	2.73	56.3	38.29	2.5	2.34	2.5	2.5	584.	376.56	.16	.14	5.	5.56
28-Apr-94	M03A0231	7.62	7.66	.5	2.68	49.6	42.69	2.5	2.31	2.5	2.5	424.	415.11	.16	.14	5.	5.56

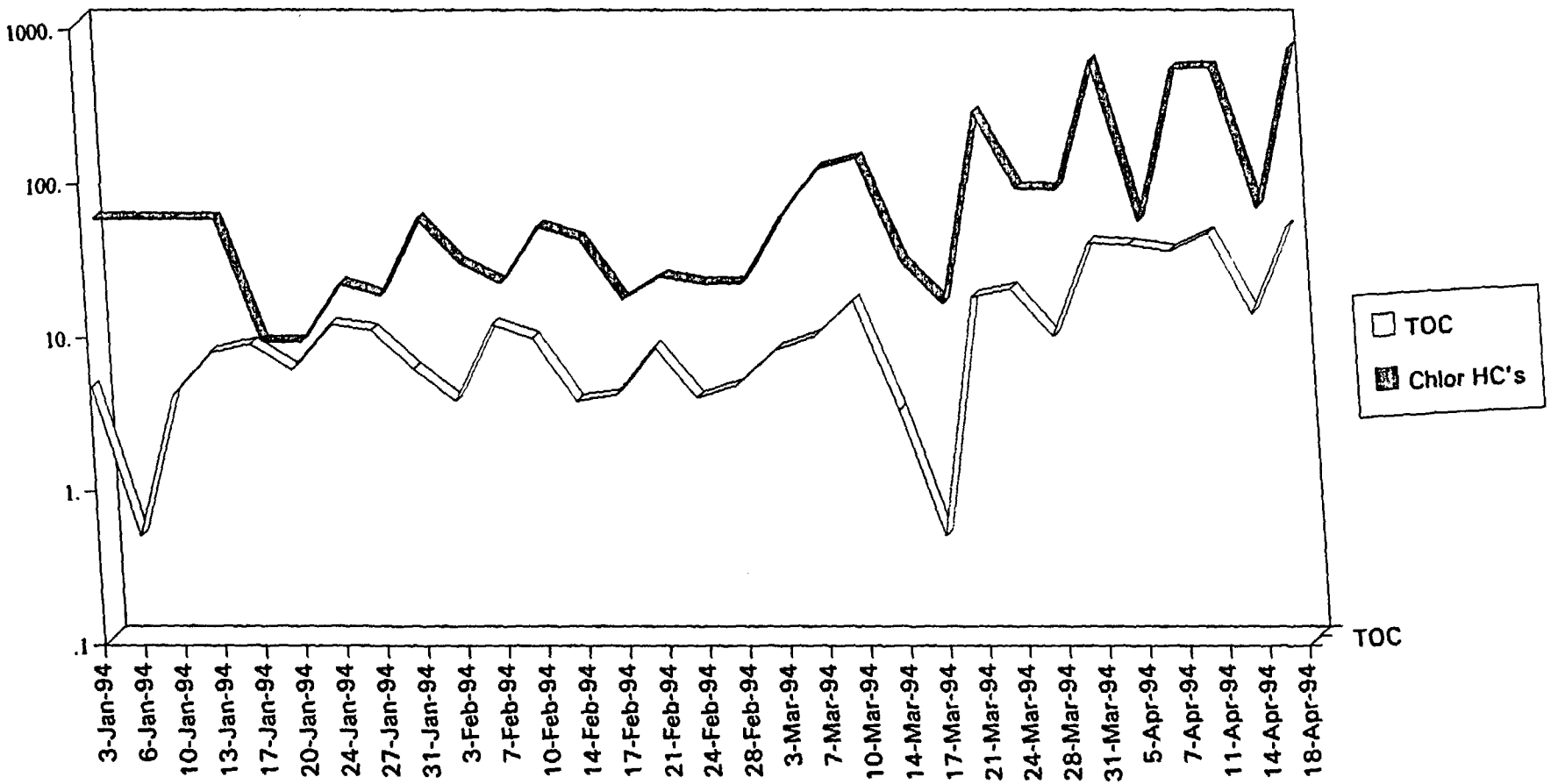
TABLE 5-2 (Continued)
Treated Water Results Summary

Collected	Set No.	As		Ba		Cd		Cr		Cu		Pb		Mn		Hg		Ni		Se		Ag		Zn	
		150 PPB		200 PPB		50 PPB		500 PP		15 PPB		66 PPB		300 PPB		1 PPB		148 PPB		20 PPB		5 PPB		162 PPB	
		Daily	R-Avg	Daily	R-Avg	Daily	R-Avg	Daily	-Av	Daily	R-Av	Daily	R-Av	Daily	R-Avg	Daily	-Av	Daily	R-Avg	Daily	R-Avg	Daily	-Av	Daily	R-Avg
17-Jan-94	M03A0203	7.4		15.3		2.5		2.	.2	2.5		21.		15.2		.1		9.5		1.5		2.		21.2	
20-Jan-94	M03A0202	10.9		12.1		2.5		2.	.4	2.5		21.		14.8		.1		9.5		1.5		2.		15.6	
24-Jan-94	M03A0204	10.		13.2		2.5		2.	.7	2.5		21.		22.9		.1		9.5		1.5		2.		24.4	
27-Jan-94	M03A0205	11.2		10.		2.5		3.5	1.1	2.5		21.		24.		.1		9.5		1.5		2.		30.	
31-Jan-94	M03A0206	17.6		12.		2.5		3.5	1.4	2.5		21.		17.		.1		9.5		1.5		2.		32.	
3-Feb-94	M03A0207	11.8		16.4		2.5		3.5	1.8	2.5		21.		22.5		.1		9.5		.5		2.		28.2	
7-Feb-94	M03A0208	9.9		17.1		2.5		2.	2.1	2.5		21.		25.7		.1		9.5		1.5		1.5		19.	
10-Feb-94	M03A0209	9.3		11.6		2.5		2.	2.3	2.5		21.		11.6		.1		9.5		1.5		1.5		18.4	
14-Feb-94	M03A0210	8.7	10.8	9.8	13.1	2.5	2.5	2.	2.5	2.5	2.5	21.	21.	9.1	18.1	.1	.1	9.5	9.5	1.5	1.4	1.5	1.8	12.8	22.4
17-Feb-94	M03A0211	13.4	11.4	10.1	12.5	2.5	2.5	2.	2.5	2.5	2.5	21.	21.	24.1	19.1	.1	.1	9.5	9.5	1.5	1.4	1.5	1.8	11.2	21.3
21-Feb-94	M03A0212	11.1	11.4	19.4	13.3	2.5	2.5	2.	2.5	2.5	2.5	21.	21.	24.6	20.2	.1	.1	22.	10.9	1.5	1.4	1.5	1.7	24.8	22.3
24-Feb-94	M03A0213	12.1	11.7	8.8	12.8	2.5	2.5	2.	2.5	2.5	2.5	21.	21.	5.	18.2	.1	.1	9.5	10.9	1.5	1.4	1.5	1.7	20.2	21.8
28-Feb-94	M03A0214	8.8	11.4	10.8	12.9	2.5	2.5	2.	2.3	2.5	2.5	21.	21.	12.2	16.9	.1	.1	9.5	10.9	.5	1.3	1.5	1.6	18.8	20.6
3-Mar-94	M03A0215	8.4	10.4	20.6	13.8	2.5	2.5	2.	2.2	2.	2.4	21.	21.	27.5	18.	.1	.1	9.5	10.9	.5	1.2	1.5	1.6	14.4	18.6
7-Mar-94	M03A0216	10.	10.2	21.7	14.4	2.5	2.5	2.	2.	2.5	2.4	21.	21.	20.8	17.8	.1	.1	9.5	10.9	.5	1.2	1.5	1.5	20.3	17.8
10-Mar-94	M03A0217	8.2	10.	25.6	15.4	2.5	2.5	2.	2.	2.5	2.4	20.5	20.9	20.8	17.3	.1	.1	9.5	10.9	.5	1.1	1.5	1.5	10.4	16.8
14-Mar-94	M03A0218	7.1	9.8	30.3	17.5	2.5	2.5	2.	2.	2.5	2.4	20.5	20.9	8.4	16.9	.1	.1	9.5	10.9	.5	.9	1.5	1.5	17.9	16.8
17-Mar-94	M03A0219	9.4	9.8	39.	20.7	2.5	2.5	2.	2.	2.5	2.4	20.5	20.8	7.3	16.7	.1	.1	9.5	10.9	.5	.8	1.5	1.5	13.3	16.8
21-Mar-94	M03A0220	12.2	9.7	31.	23.	2.5	2.5	2.	2.	2.5	2.4	20.5	20.8	32.3	17.7	.1	.1	9.5	10.9	1.	.8	1.5	1.5	17.6	17.5
24-Mar-94	M03A0221	12.8	9.9	19.6	23.	2.5	2.5	2.	2.	2.5	2.4	20.5	20.7	27.4	18.	.1	.1	9.5	9.5	1.5	.8	1.5	1.5	21.9	17.2
28-Mar-94	M03A0222	19.7	10.7	24.	24.7	2.5	2.5	2.	2.	2.5	2.4	20.5	20.7	27.	20.4	.1	.1	9.5	9.5	1.5	.8	1.5	1.5	11.	16.2
31-Mar-94	M03A0223	17.8	11.7	15.7	25.3	2.5	2.5	2.	2.	2.5	2.4	20.5	20.6	25.5	21.9	.1	.1	9.5	9.5	.5	.8	1.5	1.5	10.3	15.2
5-Apr-94	M03A0224	15.	12.5	34.	26.8	1.6	2.4	5.3	2.4	13.3	3.7	3.8	18.7	24.2	21.5	.1	.1	2.5	8.7	6.7	1.5	.3	1.4	28.6	16.8
7-Apr-94	M03A0225	18.9	13.5	.5	24.4	.3	2.2	.9	2.2	7.7	4.3	6.3	17.1	25.4	22.	.1	.1	2.2	7.9	8.4	2.3	9.8	2.3	11.	15.8
11-Apr-94	M03A0226	29.5	15.8	21.2	23.9	.4	1.9	1.	2.1	59.	10.6	4.	15.2	28.4	22.9	.1	.1	11.3	8.1	1.3	2.4	.1	2.1	30.	18.
14-Apr-94	M03A0227	24.1	17.7	13.7	22.1	2.3	1.9	2.2	2.2	41.4	14.9	10.2	14.1	10.6	23.1	.1	.1	13.	8.5	8.6	3.3	12.7	3.4	21.4	18.3
18-Apr-94	M03A0228	18.	18.7	15.	19.4	1.6	1.8	4.3	2.4	22.3	17.1	1.5	12.	27.1	25.3	.1	.1	10.8	8.6	6.	3.9	10.4	4.4	24.6	19.6
21-Apr-94	M03A0229	38.4	21.6	15.	17.6	3.2	1.9	6.7	2.9	27.2	19.8	1.5	9.9	35.7	25.7	.1	.1	16.7	9.4	6.7	4.6	17.6	6.2	33.2	21.3
25-Apr-94	M03A0230	11.	21.4	50.	21.	1.5	1.8	2.5	3.	13.	21.	57.	13.9	21.	25.	.1	.1	7.	9.2	2.5	4.7	2.5	6.3	11.	20.1
28-Apr-94	M03A0231	14.	20.7	50.	23.9	1.5	1.7	2.5	3.	6.	21.4	.8	11.7	23.	24.5	.1	.1	8.	9.	2.5	4.8	2.5	6.4	2.5	19.2

ATTACHMENT 5A

Analysis Results

Chlorinated Hydrocabons vs. TOC in CF Out Sample



CHLORHCS ?/?/S Chart 1

Metals and Nutrient Analysis
GroundwaterTreatment Plant Nutrient Supply
S16G000201
T-2 : 11-37-0

Analyte	Units	Concentration	Discharge Limit
Nitrate	PPM	458	NA
Ortho-Phosphorous	PPM	90627	NA
Arsenic	PPB	2700	150
Barium	PPB	350	200
Cadmium	PPB	18000	50
Chromium	PPB	184000	500
Copper	PPB	5800	15
Lead	PPB	76000	66
Manganese	PPB	221000	300
Mercury	PPB	0.4 (ND)	1
Nickel	PPB	4700	148
Selenium	PPB	425	20
Silver	PPB	1800	5
Zinc	PPB	180000	162

ATTACHMENT 5B

Rochem Environmental, Inc. - Progress Report

079388

ROCHEM
ENVIRONMENTAL, INC.

610 N. Milby Street
Houston, Texas 77003

Phone: (713) 224-7626
Fax: (713) 224-7627

May 4, 1994

Mr. Mark Collins
French Limited Project
15010 F.M. 2100, Suite 200
Crosby, Texas 77532

Dear Mark:

We are submitting our report for the month April.

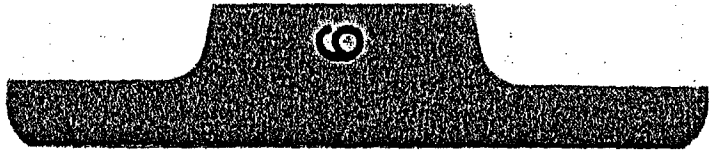
During the month, we treated 1,257,300 gallons of water. On contract we have 24,283,300 gallons to date.

Operations continue to produce excellent quality discharge at a reduced rate. The reason for the reduced flow rates are under investigation with a target to return to the 120,000 gallons per day discharge level.

Sincerely,

Kenneth A. Miller
President

/plz



6.0 AMBIENT AIR MANAGEMENT

Ambient air quality management continued on an "as-needed" basis to protect the environment and human health.

6.1 Summary of Activities

Collected and analyzed three time-integrated personnel exposure samples; the measured levels of volatile organic compounds were well below the action levels. The benzene levels were somewhat elevated, but they were well below action levels.

Sampled the ambient air in all work areas several times per shift and on a random "spot-check" basis; there were no levels of volatile organic compounds which required response action.

6.2 Problems and Response Action

Response	Solution
Calibrate portable vapor meters.	Train operators to calibrate; refurbish all meters.
Sampling "hot" wells.	Require respirator use when sampling "hot" wells.
Ambient air quality in all work areas.	Check all work areas with portable meter several times per day.

6.3 Problems Resolved

None.

6.4 On-going Events/Activities

Measure ambient air quality in all work areas several times per day.

Conduct time-integrated sampling in all major work areas.

Require respiratory protection when sampling "hot" wells.

Conduct necessary air sampling and analyses to issue "burn" permits.

Closely monitor ambient air quality in the vicinity of new projects/activities.

Conduct respirator fit tests on all employees.

7

7.0 QUALITY ASSURANCE/QUALITY CONTROL

7.1 Summary of Activities

7.1.1 Sampling

One set of personal air monitoring samples was collected in April. The following is a summary of current routine and special air matrix code sample specifics:

MATRIX CODE	SAMPLE SPECIFICS
M01D	TF at three locations

TF = Tenax® front tube

Table 7-1 is a summary of the air, soil and water samples collected for the month of April. Table 7-2 is a summary of Scheduled Sampling Events for the month of April.

7.1.2 Data Validation Activities Summary

7.1.2.1 Treated Water Samples

Data validation has been completed for sample sets M03A0213, M03A0214, M03A0215, M03A0216, M03A0217, and M03A0218, M03A0219, M03A0220, M03A0221, M03A0222 and M03A0223. These samples were collected between February 24, 1993 and March 31, 1994. These sample sets represent the last of the treated water samples to be routinely submitted to ChesterLab-Houston for analysis. QC failures are summarized in Table 7-3. Completeness values are summarized in Tables 7-4 through 7-8.

7.1.2.2 Groundwater Samples

Data validation (VSDS processing and QC review) was completed for the 20 wells sampled in March for quarterly monitoring. There were no analytical QC failures for any of these samples.

7.1.2.3 Other Samples

No special or spill sample sets have been submitted during this reporting period.

7.2 Data Validation QC Summary and Discussion

7.2.1 Level I and Level II QC Philosophy

The Quality Assurance Project Plan (QAPP) defines data validity in terms of procedural requirements which must be followed for data comparability, and numerical data quality objectives which must be met to assure precision and accuracy of the results. Precision, accuracy and completeness are the numerical Data Quality Objectives (DQOs) established for the French Project by the QAPP. The intent of the data validation process is to verify that the documentation and quality control data provided by the laboratory properly substantiate the required data quality.

The revised QAPP describes both a manual data validation process using checklists and hardcopy QC reports submitted with sample results, and a computerized data validation procedure utilizing digital sample results and QC reports. The operations phase began with manual data validation, changed to a combination of manual and computerized data validation and has now switched over completely to computerized data reporting/validation.

For purposes of data validation procedures, the QAPP defines two QC levels: Level I and Level II. Level I data validation is specified for process control and progress monitoring sample data validation and Level II data validation is specified for remediation verification sample results.

7.2.2 QA Issues

7.2.2.1 Laboratory Audit

A laboratory audit was conducted at American Analytical and Technical Services (AATS) during April. The audit results were divided into three categories as follows :

- Findings : Issues that must be addressed immediately to maintain the analytical support contract with FLTG, Inc. Corrective actions are required at once.
- Recommendations: Issues which, if addressed, would help maintain FLTG, Inc. confidence in AATS ability to produce quality data. Corrective actions or responses are requested within 90 days.
- Observations: Issues which the auditors feel would help AATS be more efficient. No corrective actions needed.

There were no findings, five recommendations and nine observations documented during the audit. Based on this audit, AATS is fully capable of providing high quality and timely analytical services for the French Ltd. Project.

7.2.2.2 Change in Air Monitoring Tube Configuration

The air monitoring tube configuration was changed during April to accommodate American Analytical and Technical Services (AATS) instrumentation. Whereas previously, Tenax filled glass tubes were utilized for personal air monitoring, the project now uses Tenax filled stainless steel tubes. The analytical methodology (TO-1) calls for either glass or stainless steel adsorbent filled tubes.

7.2.2.3 Laboratory Performance Evaluation Samples

The latest laboratory performance evaluation samples were discussed with laboratory management during the recent laboratory audit. Although some parameters were outside control limits for accuracy, the overall performance ratings were satisfactory. Corrective actions were taken to remedy the parameters that were outside control limits and future performance evaluation sample results will be submitted to the project for review as they become available.

7.2.2.4 Volatile Chlorinated Hydrocarbon Values in Treated Water Discharge Summary

Questions were raised during the latest IQAT meeting with respect to the values expressed in the treated water discharge summary as Chlorinated Hydrocarbons. The following is an explanation of the values: The daily value column represents the concentration of volatile chlorinated hydrocarbons expressed as :

- The sum of the detected concentrations of the 21 chlorinated hydrocarbons in the target compound list for Volatiles.

or

- If none of the target compounds were detected, the sum of the detection limits of the 21 chlorinated hydrocarbons in the target compound list for Volatiles. Note that the treated water discharge summary has changed due to the discharge criteria changing from a one time composite sample discharge limit, to a 30-day running average criteria. If all of the volatile chlorinated hydrocarbons are below detection limits, half of the sum of the detection limits is reported as the daily value for purpose of maintaining the integrity of the 30-day running average.

TABLE 7-1

Samples Collected - April, 1994

Sample No.	Description	Location	Date Sampled	Lab Rec'd	Data Rec'd
M01D003901	Personal air monitoring	GWTP Oper.	4/21/94	4/22/94	N
M01D003902	Personal air monitoring	Rochem Oper.	4/21/94	4/22/94	N
M01D003903	Personal air monitoring	Well Oper.	4/21/94	4/22/94	N
M03A022401	Treated water	CF Out	4/04/94	4/05/94	N
M03A022501	Treated water	CF Out	4/07/94	4/08/94	N
M03A022601	Treated water	CF Out	4/11/94	4/12/94	N
M03A022701	Treated water	CF Out	4/14/94	4/15/94	N
M03A022801	Treated water	CF Out	4/18/94	4/19/94	N
M03A022901	Treated water	CF Out	4/21/94	4/22/94	N
M03A023001	Treated water	CF Out	4/25/94	4/26/94	N
M03A023101	Treated water	CF Out	4/28/94	4/29/94	N
M06C001501	Process water	T-101 Eff	4/05/94	4/08/94	Y
M06C001502	Process water	T-101 Inf-1	4/05/94	4/08/94	Y
M06C001503	Process water	T-101 Inf-2	4/05/94	4/08/94	Y
M06C001504	Process water	R1	4/05/94	4/08/94	Y
M06C001505	Process water	R2	4/05/94	4/08/94	Y
M08A001401	Potable water	Pot. Water	4/11/94	4/12/94	N
S14A007001	GW nutrients	INT-072	4/07/94	4/08/94	N
S14A007002	GW nutrients	INT-098	4/07/94	4/08/94	N
S14A007003	GW nutrients	INT-100	4/07/94	4/08/94	N
S14A007004	GW nutrients	INT-202	4/07/94	4/08/94	N
S14A007101	GW nutrients	INT-076	4/14/94	4/15/94	N
S14A007102	GW nutrients	INT-079	4/14/94	4/15/94	N
S14A007103	GW nutrients	INT-080	4/14/94	4/15/94	N
S14A007104	GW nutrients	INT-201	4/14/94	4/15/94	N

TABLE 7-1 (Continued)

Samples Collected - April, 1994

Sample No.	Description	Location	Date Sampled	Lab Rec'd	Data Rec'd
S14A007201	GW nutrients	INT-076	4/21/94	4/22/94	N
S14A007202	GW nutrients	INT-079	4/21/94	4/22/94	N
S14A007203	GW nutrients	INT-080	4/21/94	4/22/94	N
S14A007204	GW nutrients	INT-201	4/21/94	4/22/94	N
S14A007301	GW nutrients	INT-071	4/28/94	4/29/94	N
S14A007302	GW nutrients	INT-086	4/28/94	4/29/94	N
S14A007303	GW nutrients	INT-095	4/28/94	4/29/94	N
S14A007304	GW nutrients	INT-096	4/28/94	4/29/94	N
S14C000201	Nutrient concentrate	Sol-6%	4/07/94	4/08/94	Y
S14C000202	Nutrient concentrate	Sol-9%	4/07/94	4/08/94	Y
S14K000301	New INT well baseline	INT-136	4/04/94	4/05/94	Y
S14K000302	New INT well baseline	INT-142	4/04/94	4/05/94	Y
S14K000303	New INT well baseline	INT-140	4/04/94	4/05/94	Y
S14K000304	New INT well baseline	INT-141	4/04/94	4/05/94	Y
S14K000401	New S1 well baseline	S1-065	4/20/94	4/22/94	N
S14K000402	New S1 well baseline	S1-066	4/20/94	4/22/94	N
S14K000405	New S1 well baseline	S1-069	4/20/94	4/22/94	N
S14K000406	New S1 well baseline	S1-070	4/20/94	4/22/94	N
S14L001901	Bounceback program	S1-033	4/18/94	4/19/94	N
S14L001902	Bounceback program	S1-034	4/18/94	4/19/94	N
S14L001903	Bounceback program	S1-036	4/18/94	4/19/94	N
S14L001904	Bounceback program	S1-037	4/18/94	4/19/94	N
S14L002001	Bounceback program	S1-023	4/25/94	4/26/94	N
S14L002002	Bounceback program	S1-038	4/25/94	4/26/94	N
S14L002003	Bounceback program	S1-042	4/25/94	4/26/94	N
S16B000301	Treated water metals investigation	T-101 Infl.	4/22/94	4/23/94	N
S16B000302	Treated water metals investigation	CF Bypass	4/22/94	4/23/94	N
S16B000303	Treated water metals investigation	Cell F Liq.	4/22/94	4/23/94	N

TABLE 7-1 (Continued)

Samples Collected - April, 1994

Sample No.	Description	Location	Date Sampled	Lab Rec'd	Data Rec'd
S16B000304	Treated water metals investigation	Rochem Dis.	4/22/94	4/23/94	N
S16G000201	Treatment plant nutrients	T2 11-37-0	4/21/94	4/22/94	Y
S17B000701	Rochem clogging investigation	Membrane	4/22/94	4/22/94	Y
S17B000801	Rochem clogging investigation	Memb. Scrape	4/27/94	4/22/94	Y

TABLE 7-2

Scheduled Sampling Events

Date Sampled	Set Number	Description	Schedule	
4/07/94	S14A0070	GW Nutrients (4 Wells)	Weekly	
4/14/94	S14A0071	GW Nutrients (4 Wells)	Weekly	
4/21/94	S14A0072	GW Nutrients (4 Wells)	Weekly	
4/28/94	S14A0073	GW Nutrients (4 Wells)	Weekly	
4/18/94	S14L0019	Groundwater (VOA Only)	Bi-Monthly	*
4/25/94	S14L0020	Groundwater (VOA Only)	Bi-Monthly	*
4/05/94	M06C0015	Monthly T-101 Inf & Eff	Monthly	
4/21/94	M01D0039	Personal Air Monitoring	Monthly	
4/11/94	M08A0014	Potable Water Sampling	Monthly	
4/04/94	M03A0224	Treated Water	Bi-Weekly	
4/07/94	M03A0225	Treated Water	Bi-Weekly	
4/11/94	M03A0226	Treated Water	Bi-Weekly	
4/14/94	M03A0227	Treated Water	Bi-Weekly	
4/18/94	M03A0228	Treated Water	Bi-Weekly	
4/21/94	M03A0229	Treated Water	Bi-Weekly	
4/25/94	M03A0230	Treated Water	Bi-Weekly	
4/28/94	M03A0231	Treated Water	Bi-Weekly	

* = Samples scheduled bi-monthly during bounce-back program.

TABLE 7-3

Treated Water
QC Failure Summary

Sample Date	Test	QC Failure	Explanation	Corrective Action
02/24/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
02/24/94	SE	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
02/24/94	SE	MS Recov.	Failed matrix spike on group leader; LCS recovery good.	Matrix effect-no corrective action necessary
02/24/94	AS	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
02/24/94	AS	MS Recov.	Failed matrix spike on group leader; LCS recovery good.	Matrix effect-no corrective action necessary
02/28/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
02/28/94	SE	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
02/28/94	SE	MS Recov.	Failed matrix spike on group leader; LCS recovery good.	Matrix effect-no corrective action necessary
02/28/94	VOA	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
03/03/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
03/03/94	SE	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
03/03/94	VOA	SU Recov.	SU3 recovery was low on -01 MS, recovery was good on -01 and -01 MSD	Spike accuracy and precision were within limits; data quality not effected.
03/03/94	VOA	RRT-Samp	RRT failure on 1,2-Dichloroethene(total)	Instrument identifies most predominant isomer; data quality not effected.
03/10/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
03/10/94	AG	Lab blank	Silver detected in lab blank	Sample concentration below action level; data quality not effected.
03/10/94	VOA	RRT-Samp	RRT failure on 1,2-Dichloroethene(total)	Instrument identifies most predominant isomer; data quality not effected.
03/14/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
03/14/94	SE	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
03/14/94	AS	FAS Recov.	Failed post digestion spike; MSA used but correlation coefficient low	Matrix effect-no corrective action necessary
03/17/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality

TABLE 7-3 (Continued)

Treated Water
QC Failure Summary

Sample Date	Test	QC Failure	Explanation	Corrective Action
03/17/94	SE	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
03/21/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
03/21/94	SE	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
03/21/94	VOA	RRT-Samp	RRT failure on 1,2-Dichloroethene(total)	Instrument identifies most predominant isomer; data quality not effected.
03/24/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
03/24/94	VOA	RRT-Samp	RRT failure on 1,2-Dichloroethene(total)	Instrument identifies most predominant isomer; data quality not effected.
03/24/94	SE	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
03/24/94	SE	MS Recov.	Failed matrix spike on group leader; LCS recovery good.	Matrix effect-no corrective action necessary
03/24/94	AS	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary
03/24/94	AG	Lab blank	Silver detected in lab blank	Sample concentration below action level; data quality not effected.
03/28/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
03/28/94	VOA	RRT-Samp	RRT failure on 1,2-Dichloroethene(total)	Instrument identifies most predominant isomer; data quality not effected.
03/28/94	SE	MS Recov.	Failed matrix spike on group leader; LCS recovery good.	Matrix effect-no corrective action necessary
03/28/94	AG	Lab blank	Silver detected in lab blank	Sample concentration below action level; data quality not effected.
03/28/94	PCB	12 hour	-01 MS and -01 MSD analyzed more than 12 hours after first continuing calibration	Second continuing calibration was well within control limit parameters; data quality not effected
03/31/94	SV	RRT-Calib	Failed peak no. and RRT for calibration	Confirmed mass spectra-doesn't affect data quality
03/31/94	VOA	RRT-Samp	RRT failure on 1,2-Dichloroethene(total)	Instrument identifies most predominant isomer; data quality not effected.
03/31/94	VOA	Holding Time	Sample dilution was analyzed outside 14 day holding time	Original and dilution analysis concentrations correlated well; data quality not effected.
03/31/94	SE	FAS Recov.	Failed post digestion spike; MSA not used due to low absorbance	Matrix effect-no corrective action necessary

7.2.3 Completeness Summaries

Tables 7-4 through 7-8 summarize completeness values for VOA, SVA, PCBs, Metals and miscellaneous parameters on treated water samples.

VOA (Table 7-4)

A total of 11 VOA sample sets have been validated with all categories meeting Project Completeness Goals.

SVA (Table 7-5)

A total of 11 SVA sample sets have been validated for this time period. All categories meet or exceed Project Completeness Goals with the exception of Project to Date (PTD) IS/SU Corrective Action at 89% completeness. This low value is a vestige of initially low Corrective Action completeness for analytical data in early 1992.

PCBs (Table 7-6)

A total of 11 PCB sample sets have been validated for this time period with all samples, meeting data quality objectives. All categories meet or exceed Project Completeness Goals.

Metals (Table 7-7)

A total of 11 sample sets have been validated for this time period. Project Completeness Goals are met or exceeded in all categories with the exception of those listed in Table 7-7.

Miscellaneous Parameters (Table 7-8)

A total of 11 sample sets have been validated for this time period. Project completeness goals are met or exceeded in all categories.

TABLE 7-4

Completeness Summary
M03A Treated Water
Volatile Organics Analyses

SAMPLE DATE SET NUMBER	M03A0213 through M03A0223	Project to Date	PROJECT GOAL
Analysis Holding Time	95	100	100
12 Hour Window	100	100	100
SU Check	100	92	90
SU1 (d4-1,2-DCE)	100	96	90
SU2 (d8-Toluene)	100	97	90
SU3 (4-BFB)	100	99	90
IS Check	100	100	90
IS1 (BrClMethane)	100	100	90
IS2 (1,4-DiFlBenzene)	100	100	90
IS3(d5-ClBenzene)	100	100	90
Sample RT/RRT Check	100	*	
Vinyl Chloride			
Accuracy	100	99	90
Precision	100	99	90
Benzene			
Accuracy	100	99	90
Precision	100	100	90
No Group Matrix Effect	100	*	90
No Sample Matrix Effect	100	*	90
Tune Check	100	*	
Overall ICAL Check	100	*	
Overall CCAL Check	100	*	
Overall Lab Blank Check	100	*	

* - Level II QC checks were performed on 10% of samples prior to 6/14/93. PTD completeness values do not apply to these checks.

TABLE 7-5

Completeness Summary
M03A Treated Water
Semivolatile Organic Analyses

SAMPLE DATE SET NUMBER	M03A0213 through M03A0223	Project to Date	PROJECT GOAL
Extract Holding Time	100	100	100
Analysis Holding Time	100	100	100
12 Hour Window	100	100	100
SU Check	**100**	**94**	**90**
SU1 (2-FlPhenol)	100	94	90
SU2 (d5-Phenol)	100	92	90
SU3 (d5-Nitrobenz)	100	97	90
SU4(2-FlBiphenyl)	100	99	90
SU5(2,4,6-TBPh)	100	95	90
SU6(d14-Terphen)	100	96	90
IS Check	**100**	**95**	**90**
IS1 (d4-1,4-DiClBenz)	100	100	90
IS2 (d8-Naph)	100	100	90
IS3 (d10-Acenaph)	100	100	90
IS4 (d10-Phenanth)	100	99	90
IS5 (d12-Chrysene)	100	97	90
IS6 (d12-Perylene)	100	95	90
Sample RT/RRT	100	*	*
Napthalene			
Accuracy	100	100	90
Precision	100	99	90
No Group Matrix Effect	100	100	90
No Sample Matrix Effect	100	91	90
Tune Check	100	*	*
Overall ICAL Check	100	*	*
Overall CCAL Check	100	*	*
Overall Lab Blank Check	100	*	*

* - Level II QC checks were performed on 10% of samples prior to 6/14/93.
PTD completeness values do not apply to these checks.

TABLE 7-6

Completeness Summary
M03A Treated Water
PCB Analyses

SAMPLE DATE SET NUMBER	M03A0213 through M03A0223	Project to Date	PROJECT GOAL
Extract Holding Time	100	100	100
Analysis Holding Time	100	100	100
12 Hour Window	97	100	100
SU Check - Column A	94	100	90
SU1 (DCBP)	100	81	NS
SU2 (TCMX)	100	97	NS
SU Check - Column B	100	99	90
SU1 (DCBP)	100	82	NS
SU2 (TCMX)	100	99	NS
SU Check - Column A or B	100	99	90
Aroclor 1242			
Accuracy	100	96	90
Precision	100	96	90
Overall ICAL Check	100	*	
Overall 1st CCAL Check	100	*	
Overall 2nd CCAL Check	100	*	
Overall Lab Blank Check	100	*	

* - Level II QC checks were performed on 10% of samples prior to 6/14/93. PTD completeness values do not apply to these checks.

TABLE 7-7

Completeness Summary
M03A Treated Water
Metals Analyses

SAMPLE DATE SET NUMBER	M03A0213 through M03A0223	PROJECT GOAL
ANALYTE: BARIUM		
MS Accuracy	100	95
DUP Precision/Difference	100	95
No Matrix Interference*	100	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100
ANALYTE: CADMIUM		
MS Accuracy	100	95
DUP Precision/Difference	W	95
No Matrix Interference*	100	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100
ANALYTE: CHROMIUM		
MS Accuracy	100	95
DUP Precision/Difference	W	95
No Matrix Interference*	100	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100
ANALYTE: COPPER		
MS Accuracy	100	95
DUP Precision/Difference	100	95
No Matrix Interference*	100	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100
ANALYTE: LEAD		
MS Accuracy	100	95
DUP Precision/Difference	100	95
No Matrix Interference*	100	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100

W - All samples waived due to low response

* Matrix interference is indicated by:
Furnace analyses - failure of analytical spike or low MSA coefficient
ICP analyses - failure of serial dilution

TABLE 7-7 (Continued)

Completeness Summary
M03A Treated Water
Metals Analyses

SAMPLE DATE SET NUMBER	M03A0213 through M03A0223	PROJECT GOAL
ANALYTE: MANGANESE		
MS Accuracy	100	95
DUP Precision/Difference	100	95
No Matrix Interference*	100	NA
Prep Blank Check	NA	100
Lab Control Spike Check	100	100
ANALYTE: NICKEL		
MS Accuracy	100	95
DUP Precision/Difference	W	95
No Matrix Interference*	100	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100
ANALYTE: SILVER		
MS Accuracy	100	95
DUP Precision/Difference	W	95
No Matrix Interference*	100	NA
Prep Blank Check	91	100
Lab Control Spike Check	100	100
ANALYTE: ZINC		
MS Accuracy	100	95
DUP Precision/Difference	100	95
No Matrix Interference*	100	NA
Prep Blank Check	NA	100
Lab Control Spike Check	100	100
ANALYTE: MERCURY		
MS Accuracy	100	95
DUP Precision/Difference	W	95
No Matrix Interference*	100	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100

W - All samples waived due to low response

* Matrix interference is indicated by:
Furnace analyses - failure of analytical spike or low MSA coefficient
ICP analyses - failure of serial dilution

TABLE 7-7 (Continued)

Completeness Summary
M03A Treated Water
Metals Analyses

SAMPLE DATE SET NUMBER	M03A0213 through M03A0223	PROJECT GOAL
ANALYTE:ARSENIC		
MS Accuracy	91	95
DUP Precision/Difference	100	95
No Matrix Interference*	73	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100
ANALYTE: SELENIUM		
MS Accuracy	64	95
DUP Precision/Difference	100	95
No Matrix Interference*	28	NA
Prep Blank Check	100	100
Lab Control Spike Check	100	100

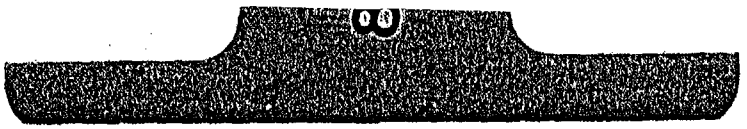
W - All samples waived due to low response

* Matrix interference is indicated by:
Furnace analyses - failure of analytical spike or low MSA coefficient
ICP analyses - failure of serial dilution

TABLE 7-8

Completeness Summary
M03A Treated Water
Miscellaneous Parameters Analyses

SAMPLE DATE SET NUMBER	M03A0213 through M03A0223	Project to Date	PROJECT GOAL
PARAMETER: TOC			
Analysis Hold Time	100	100	100
MS Accuracy	100	100	NA
DUP Precision	100	100	NA
PARAMETER: OILS			
Analysis Hold Time	100	100	100
MS Accuracy	100	100	NA
DUP Precision	100	100	NA
PARAMETER: TSS			
Analysis Hold Time	100	100	100
MS Accuracy	NA	NA	NA
DUP Precision	100	100	NA



8.0 SITE MAINTENANCE

8.1 Summary of Activities

8.1.1 General Housekeeping

The site safety and housekeeping inspections and responses kept grounds safe and attractive for employees and visitors. The entire project was inspected twice per week, with written inspection reports issued and appropriate corrective action taken.

8.1.2 Purchasing

All purchases were covered by written requisitions and purchase orders. Purchase of chemicals is now reduced to groundwater treatment and insitu remediation.

8.1.3 Equipment Maintenance

Routine preventive and production maintenance was performed on all equipment. There were no emergency maintenance jobs.

8.2 Visitors

The following visitors were recorded at the site during April:

April 5:	P.A. Osburn, LCEC Tommy Manno, LCEC
April 6:	Nick Kostelnik, Biosystems
April 9:	Michelle Woo, visitor Brian M. Reinford, visitor
April 11:	Mike Quattrini, Consultant Ben Schuster, ARCO

April 11:	Mark Brewer, Northwood University
	Ken Daigrapont
	Pamela Rarnzen
	Mark Basford
	Margaret I. Cain
	Maime Zabraski
	Sam Elahmad
	Ken Sparics
	Carl Pinkney
	Robby Gaines
	Glen Anderson
	Sam Buattsisarsico
	Robert F. Sandly
	Rudy Paramong
	Zenita Whitlake
	Joseph D. Glass
	Anita Jackson
	Susan McCurdy
	Cheryl Rice
	Jill Berthall
	Diane Hamilton
April 12:	Ben Schuster, ACC
	C. Schneider, ACC
	Chris Hughes, Skyline Steel
	John Mooney, The Positive Image
	Salil Sen, Calgon Corporation
	Gary Gunnerson, Calgon Corporation
April 13:	Gary McGill, TNRCC
	Spencer Chamber, Sen. Dan Shelly, State of Texas
	Karen Gibson, House Appropriations, State of Texas
	Lance Lively, Rep. Alexander, State of Texas
	Ben Schuster, ARCO
	John S. Meltop, CH2M Hill

Renato Cuellar, State Rep. District 39, State of Texas
Jack Kramer, TNRCC
David Duncan, TNRCC
Rueben Martinez, Harris County Health Dept.
Karen Brandt, AATS

April 14:
Don Cruver, Hill International
Ken Dunn, Hill International
Owen Joyun, DML
Todd Griffith, Ind. Surplus Supply
Wayne Crouch, Crouch Environmental
Earl Hendrick, EPA

April 15:
Jeff Noe, Jeff Noe & Sons
Keith Henry, Baywood Evi.
Dave Dougherty, Brown & Root
Chris McGee, Geo-Con
Gene Hensgen, Inquip
Chuck Collins, Sr., Tom-Mac

April 17:
Chuck Collins, Sr., Tom-Mac

April 19:
Jerry Eldridge, R.L. Eldridge Const.
R.L. Eldridge, R.L. Eldridge Const.
George Parker, Channelview Truck
Byron R. Dees, Dees Industrial
Floyd Woods, Woods Bros.
Norman Parker, Channelview Truck
John Tredgold, Channel 2 News
BeBe Burns, Channel 2 News

April 20:
Don King, Rdelman
Dyron Dakle, Rdelman
C.H. Chen, ACC
H.J. Carradine, ACC

April 21:	Jim Mills, Barrett-Crosby Environ. League
	Huey Carter
	Jesse Berotte, MUD 50
	Alfred S. Collins, MUD 50
	Jake McAllister
	Jerry E. Bluitt
	Al Coudlow, Barrett Station Chamber of Commerce
	Wilbert L. Eagleten, Barrett Station Chamber of Commerce
April 26:	David Duncan, TNRCC
	Greg Pfeifer, TNRCC
	Katharine Marvin, TNRCC
	Vic McWherter, TNRCC
	Ann Foster, TNRCC
	Fay Duke, TNRCC
	Jeff Patterson, TNRCC
April 27:	Teresa Hurst, Sommers & Associates
April 28:	H.I. Pendley, H.I. Pendley Co.
	Felix Rodriguez, Godwin Ind.
	David H. Godwin, Godwin Ind.
April 29:	Norman Parrea, Channelview Truck
	Ray Bushwell, Channelview Truck

8.3 Emergency Equipment

8.3.1 Flood Gate Test

The exclusion wall gate was closed on April 13, 1994 with a good seal noted and recorded.

8.3.2 P-8 Auxiliary Pump

P-8 Auxiliary Pump was exercised on April 24, 1994.

8.3.3 Fire Extinguishers

All fire extinguishers were inspected and certified.

8.4 Security

Smith Security provides 24-hour security at the FLTG site, including the south side of Gulf Pump Road; all site areas are checked hourly. There were no security incidents recorded in April.

8.5 Operator Training

All training is documented and records are maintained on site. Semi-annual physicals are scheduled for the next two months.

8.6 Data Management

Data base programming is fully operational. Data is entered on a daily basis.

8.7 Personnel Monitoring

Results of personnel monitoring conducted during April are included in Table 8-1.

8.8 OVM System

The Ambient Air System, Tenax® A and C included, were taken out of service in December. The meteorological station remains operational.

8.9 Repository

Records from the April review are listed in Attachment 8A.

TABLE 8-1

On-Site Employee Contaminant Limits
(From OSHA 29 CFR 1910 Subpart Z)

Compound	PEL 8 hour PPM	M01D0039 21-Apr-94 Well Operator		M01D0039 21-Apr-94 GWTP Operator		M01D0039 21-Apr-94 Rochem Operator	
		% of PEL	PPM	% of PEL	PPM	% of PEL	PPM
Chloromethane	50	0.000	0.000	0.000	0.000	0.000	0.000
Bromomethane	5	0.000	0.000	0.000	0.000	0.000	0.000
Vinyl chloride	1	0.000	0.000	0.000	0.000	0.000	0.000
Chloroethane	1000	0.000	0.000	0.000	0.000	0.000	0.000
Dichloromethane	50	0.016	0.008	0.003	0.001	0.002	0.001
Acetone	750	0.015	0.110	0.002	0.015	0.002	0.013
Carbon disulfide	10	0.000	0.000	0.000	0.000	0.000	0.000
1,1-Dichloroethene	5	0.000	0.000	0.000	0.000	0.000	0.000
1,1-Dichloroethane	100	0.002	0.002	0.001	0.001	0.000	0.000
trans-1,2-Dichloroethe	200	0.002	0.004	0.000	0.000	0.000	0.000
Chloroform	10	0.046	0.005	0.059	0.006	0.018	0.002
1,2-Dichloroethane	10	0.025	0.003	0.030	0.003	0.012	0.001
2-Butanone	200	0.004	0.009	0.001	0.002	0.003	0.007
1,1,1-Trichloroethane	350	0.021	0.073	0.005	0.016	0.008	0.029
Carbon Tetrachloride	5	0.023	0.001	0.011	0.001	0.006	0.000
Vinyl acetate	10	0.000	0.000	0.000	0.000	0.000	0.000
Bromodichloromethane			0.000		0.000		0.000
1,2-Dichloropropane	75	0.000	0.000	0.000	0.000	0.000	0.000
cis-1,3-Dichloropropen	1	0.000	0.000	0.000	0.000	0.000	0.000
Trichloroethene	50	0.002	0.001	0.002	0.001	0.000	0.000
Dibromochloromethane			0.000		0.000		0.000
1,1,2-Trichloroethane	10	0.000	0.000	0.000	0.000	0.000	0.000
Benzene	1	1.173	0.012	0.465	0.005	0.084	0.001
trans-1,3-Dichloroprop	1	0.000	0.000	0.000	0.000	0.000	0.000
2-Chloroethylvinyl ether			0.000		0.000		0.000
Bromoform	0.5	0.000	0.000	0.000	0.000	0.000	0.000
4-Methyl-2-pentanone	50	0.008	0.004	0.002	0.001	0.009	0.004
2-Hexanone	5	0.007	0.000	0.012	0.001	0.011	0.001
Tetrachloroethene	50	0.003	0.002	0.003	0.002	0.001	0.000
1,1,2,2-Tetrachloroet	1	0.000	0.000	0.000	0.000	0.000	0.000
Toluene	100	0.006	0.006	0.005	0.005	0.001	0.001
Chlorobenzene	10	0.000	0.000	0.000	0.000	0.000	0.000
Ethylbenzene	100	0.002	0.002	0.001	0.001	0.001	0.001
Styrene	50	0.001	0.000	0.001	0.001	0.000	0.000
Xylene (total)	100	0.003	0.003	0.003	0.003	0.002	0.002
Hexane			0.004		0.004		0.002

ATTACHMENT 8A

Repository Status Report: April, 1994

REPOSITORY STATUS REPORT: APRIL, 1994

At the Rice University Library...

1. Remedial Investigation Report April, 1985

2. Remedial Investigation Report June, 1986 (Updated from April, 1985)

3. Remedial Investigation Report Volume I, April, 1985

4. Remedial Investigation Report Appendices, Volume I, February, 1986 (Revised June, 86)

5. Remedial Investigation Report Appendices, Volume II, April, 1985

6. Remedial Investigation Report Appendices, Volume II, February, 1986 (Revised June, 1986)

7. Remedial Investigation Report Appendices, Volume III, February, 1986

8. 1986 Field Investigation Hydrology Report, December 19, 1986

9. 1986 Field Investigation and Supplemental Remedial Investigation Report Volume I, December, 1986

10. 1986 Field Investigation and Supplemental Remedial Investigation Report French Limited Site Volume II, Appendices December, 1986

11. Feasibility Study Report, March 1987

12. Feasibility Study Report, March 1987, Executive Summary
    P. ii-iv Missing
    P. ix-xiv Missing
    Pages 1-5 thru 1-13 Missing
    No Appendix F - Component Description and Costing Information
    (Only Appendix D with Numbered Pages)

13. French Limited Site Focused Feasibility Study (May 1987)

14. Endangerment Assessment Report February, 1987

15. Endangerment Assessment Report April 1987 (Updated from February, 1987)

16. Public Health Assessment for French Limited March 30, 1993 from U.S. Department of Health and Human Services

17. Proposed In Situ Biodegradation Demonstration French Limited Site Phase III, April, 1987

18. In Situ Biodegradation Demonstration Report Volume I Executive Summary, October 30, 1987
    - Table's Not Page Numbered
    - Section 1 Pages 1-1 Missing
    - Section 2 Pages 2-1 Missing
    - Section 3, Two Pages 3-1 with First Page Crossed Out
    - Section 3, Page 3.5 Shaping the Dike Before Air Sparger Installation Missing
    - Section 4, Two Pages 4-12 with First Page Crossed Out
    - Section 4, Page 4-3 is Missing
    - Section 5, Two Pages 5-31 with First Page Crossed Out
    - Section 5, Two Figure 5-4 with First Page Crossed Out
    - Section 7, Two Pages 7-6 with First Page Crossed Out and Second Page with Correction Written in second to Last Paragraph
    - Section 8, Two Pages 8-1 with First Page Crossed Out
    - Section 8, Two Pages 8-3 with First Page Crossed Out
    - Section 9, Two Pages 9-7 with First Page Crossed Out
    - Section 10, Two Pages 10-3 with First Page Crossed Out
    - Section 10, Two Pages 10-7 with First Page Crossed Out
    - Section 10, Two Pages 10-9 with First Page Crossed Out

19. In Situ Biodegradation Demonstration Report Volume II, October 30, 1987 (Revised February 1, 1988 at Site only)

20. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume I, November 30, 1987

21. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume II, November 30, 1987 + Appendices

22. In Situ Biodegradation Demonstration French Limited May/June 1988 Monthly Report, Equipment Evaluation Phase IV

23. In Situ Bioremediation Demonstration French Limited July, 1988 Monthly Report, Equipment Evaluation Phase IV

24. In Situ Biodegradation Demonstration Supplemental Report French Limited Site, Volume IV November 30, 1987 + Appendices

25. Summary of Remedial Alternative Selection 1988

26. Declaration for the Record of Decision 1988

27. Results of the French Limited Task Group Survey (Goldman and Company) April, 1987

28. Goldman Public Relations Clipping Report

29. Record of Public Meeting Regarding Remedial Investigation and Feasibility Study (5-21-87)

30. Record of Public Meeting Regarding Remedial Investigation and Feasibility Study (2-11-88) (Updated from June 21, 1987)

31. Consent Decree between the Federal Government and the FLTG

32. French Limited Superfund Site Community Relations Revised Plan August, 1989 - Jacob's Engineering

33. Laboratory Evaluation of Biodegradation at the French Limited Site

34. Field Evaluation of Biodegradation at the French Limited Site (Phase II) Volume I

35. Bioremediation Facilities Design Report Volume II of IV Appendices, Reports and Calculations (March 20, 1991)

36. Bioremediation Facilities Design Report Volume III of IV Appendix E - Design Specifications (March 20, 1991)

37. Bioremediation Facilities Design Report Volume IV of IV - Air Monitoring, March 20, 1991
    Section 3.0 Page 3-7 Missing

38. Remedial Action Plan Volume I - April, 1990

39. Remedial Action Plan Volume I - September, 1990 (Updated from April, 1990)

40. Remedial Action Plan Volume II Quality Assurance April, 1990

41. Remedial Action Plan Volume II Quality Assurance September, 1990 (Updated from April 1990) Revised June 3, 1991

42. Remedial Action Plan Volume II Quality Assurance June, 1990
Appendix A - Quality Assurance Sampling Procedures and
Appendix B - Analytical Methods - B.1 - B.53, September 22, 1989
Revised September 28, 1990

43. Remedial Action Plan Volume III - Health and Safety, July 20, 1990

44. Remedial Action Plan Volume IV - Spill and Volatile Organic Release Contingency Plan (April 6, 1990)

45. Remedial Action Plan Volume V - Shallow Aquifer and Subsoil Remediation Process Design, May, 1990
Page v.i.3 Missing

46. Remedial Action Plan Volume V - Shallow Aquifer and Subsoil Remediation Process Design, July 20, 1990, (Updated from May, 1990)

47. Hydrogeologic Characterization Report, March 1989

48. Hydrogeologic Characterization Report - Appendices, March 1989

49. December, 1987 French Limited Monthly Report Equipment Evaluation Phase IV

50. January, 1988 Monthly Report Equipment Evaluation Phase IV

51. Supplemental Biodegradation Equipment Evaluation French Limited Site - Phase IV, September 26, 1988

52. 1988 Equipment Evaluation Phase IV Report French Limited Site: Volume I, February 1,1990

53. 1988 Equipment Evaluation Phase IV Report French Limited Site: Volume II, February 1, 1990

54. Site Safety and Health Plan French Limited Site - Phase III, April 1987 (Revision 2)

55. San Jacinto River May 19, 1989 Flood Event Report, June 1989

56. Post San Jacinto River May 1989 Flood Event Soils and Water Analysis Program - Volume I, August 16, 1989

57. Post San Jacinto River 1989 Flood Event Soil and Water Analysis Program Volume II, Appendix A

58. Post San Jacinto River 1989 Flood Event Soil and Water Analysis Program Volume III, Appendix A, August 16, 1989

59. 1988 Slough Investigation Report French Limited Site, October 1988 (2 Copies)

60. Flood and Migration Control Wall Design Report, August 16, 1989

61. Flood and Migration Control Wall Design Report Appendix C Access Way Design, September, 1989

63. Installation Report for Flood and Migration Control Wall, January 8, 1990

64. Installation Report for Flood and Migration Control Wall Appendix A - ENSR Site Logs

65. Installation Report for Flood and Migration Control Wall Appendix 5B - Inspection Reports

66. Installation Report for Flood and Migration Control Wall
Appendix C - Pile Driving Inspection Report January 8, 1990

67. Flood Wall Gate Test Report French Limited Site, February 1990

68. North Pit Remediation Report French Limited Site, November 6, 1989

69. Workplan for the Shallow Aquifer Pumping Tests for the French Limited Site, July 22, 1988 (2 Copies)
Extra Page (Map) Between Pages 6 and 7
Page 80 Missing

70. French Limited Site Hurricane Gilbert Preparation Report, October, 1988

71. Riverdale Lake Area Remediation Program August 15, 1989

72. In Situ Biodegradation Demonstration Phase III Quality Assurance Project Plan for French Limited Site, March, 1987

73. Addendum to Quality Assurance Project Plan for the French Limited Site In Situ Biodegradation Demonstration Phase III, February 16, 1990

74. Potable Water Well Installation Report French Limited Site, December 7, 1988

75. Bioresidue Fixation Alternatives Evaluation Report French Limited Site March 20, 1989

76. Ambient Air Impact Risk Assessment Report, May 5, 1989

77. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume I of III - Summary Report and Appendices A-H, July 1991

78. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume II of III - Appendices I-W, June 1991

79. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume III of III - Appendices X-Z, June 1991

80. French Limited Remediation Design Report - Executive Summary Bioremediation/Shallow Aquifer, July, 1991

81. January 1992 Monthly Progress Report

    January 1992 Monthly Progress Report Appendices A, B, C,

    January 1992 Monthly Progress Report Appendices E, F

    January 1992 Monthly Progress Report Appendix G

82. February 1992 Monthly Progress Report

    February 1992 Monthly Progress Report Appendices A, B,

    February 1992 Monthly Progress Report Appendices C 1 and C 2

    February 1992 Monthly Progress Report Appendices D, E

83. July 1992 Monthly Progress Report with Appendices A, B

84. December 1992 Monthly Progress Report

    December 1992 Monthly Progress Report and Appendices A, B

87. March 1993 Monthly Progress Report

88. April 1993 Monthly Progress Report

89. Black EPA Binder

90. Monthly Summary Report May, 1993

91. Monthly Summary Report June, 1993

92. Monthly Summary Report July, 1993

93. Monthly Summary Report August, 1993

94. Monthly Summary Report September, 1993

95. Monthly Summary Report October, 1993

96. Monthly Summary Report November, 1993

97. Monthly Summary Report December, 1993

98. Monthly Summary Report January, 1994

99. Monthly Summary Report, February, 1994

100. Monthly Summary Report, March, 1994

At the Crosby Library...

2. Remedial Investigation Report - June, 1986

3. Remedial Investigation Volume I - Appendices 4-85

4. Remedial Investigation Appendices Volume I June, 1986 Revised from Feb. 1986
   Page J-7 to J-14 Missing
   Resource E Tabs Analytical Report Worksheet, Page 6 Missing

5. Remedial Investigation Volume II - Appendices 4-85

6. Remedial Investigation Appendices Volume II June, 1986 Revised from Feb. 1986
   Tab 6, Soil Boring Logs B-12, B-13, B-15, B-16, B-17, B-31, B-32 Missing

7. Remedial Investigation Appendices Volume III February, 1986
   Pages 1 and 2 of 10 Res. Engr Tab Missing
   Analytical Report Worksheet 7-8-9-10 Missing
   Pages 1 and 2 of 6 Missing
   Tab 9 H 1-8 Missing, H 11-19 Missing, Page 1 of 10 Missing,
   Page 3 Worksheet Missing
   Tab 10 H 1-3 Missing, Page 3-6 of 6 Missing, Page 1-6 Missing
   Tab 12 Page 2-10 of 10 Missing

8. 1986 Field Investigation Hydrology Report, December 19, 1986

9. 1986 Field Investigation and Supplemental Remedial Investigation Report Volume I, December, 1986

10. 1986 Field Investigation and Supplemental Remedial Investigation Report Volume II, Appendices, December 1986

11. Feasibility Study Report, March 1987 (2 Copies)

13. French Limited Site Focused Feasibility Study, May 1987, Page 45 Missing

14. Endangerment Assessment Report February 1987 (2 copies)

15. Endangerment Assessment Report April 1987 (2 copies)

16. Public Health Assessment Addendum - March 30, 1993
Missing Page 27 and 31

18. In Situ Biodegradation Demonstration Report Volume I Executive Summary October, 1987 (Revised 12-15-87)

19. In Situ Biodegradation Demonstration Report Volume II October 30, 1987

20. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume I, November 30, 1987
Missing Supplements to 5-6 and 7 to 10

21. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume II, November 30, 1987 + Appendices

23. In Situ Biodegradation Demonstration French Limited Monthly Report for July, 1988

24. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume IV, November 30, 1987 + Appendices

27. Results of the French Limited Task Group Survey (Goldman and Company) April 1987

28. Goldman Public Relations Clipping Report

30. Record of Public Meeting Regarding Remedial Investigation and Feasibility Study (February 11, 1988) (Additional Title - Record of Public Meeting to Discuss and Accept Public Comments on the Proposed Remedy for French Limited Site)

31. Consent Decree between the Federal Government and the FLTG (2 Copies)

33. Laboratory Evaluation of Biodegradation at the French Limited Site, December 1986.

34. Field Evaluation of Biodegradation at the French Limited Site (Phase II) Volume I, March, 1987

35. *Bioremediation* Facilities Design Report Volume II of IV Appendices, Reports and Calculations March 20, 1991

36. Bioremediation Facilities Design Report Volume III of IV Appendix E - Design Specifications March 20, 1991

37. Bioremediation Facilities Design Report Volume IV of IV Air Monitoring, March 20, 1991

39. Remedial Action Plan Volume I, September 28, 1990

41. Remedial Action Plan Volume II - Quality Assurance, Revised June 3, 1991

42. Remedial Action Plan Volume II - Appendix A - Quality Assurance Sampling Procedures and Appendix B - Analytical Methods - B.1 - B.53, September 28, 1990

43. Remedial Action Plan Volume III - Health and Safety, July 20, 1990

46. Remedial Action Plan Volume V - Shallow Aquifer and Subsoil Remediation Process Design, July 20, 1990 (2 Copies)

47. Hydrogeologic Characterization Report, March 1989

48. Hydrogeologic Characterization Report Appendices, March 1989

49. Equipment Evaluation Phase IV Report December, 1987 Monthly Report

51. Supplemental Biodegradation Equipment Evaluation French Limited Site - Phase IV, September 26, 1988

52. 1988 Equipment Evaluation Phase IV Report French Limited Site: Volume I, February 1, 1990

53. 1988 Equipment Evaluation Phase IV Report French Limited Site: Volume II, February 1, 1990

54. Site Safety and Health Plan French Limited Site - Phase III, April 1987 (Revision 2)

55. San Jacinto River May 19, 1989 Flood Event Report, June 1989

56. Post San Jacinto River May 1989 Flood Event Soils and Water Analysis Program Volume I, August 16, 1989

57. Post San Jacinto River 1989 Flood Event Soil and Water Analysis Program Volume II, Appendix A

58. Post San Jacinto River 1989 Flood Event Soil and Water Analysis Program Volume III, Appendix A, August 16, 1989

59. 1988 Slough Investigation Report French Limited Site, October 1988 (2 Copies)

60. Flood and Migration Control Wall Design Report, August 16, 1989

61. Flood and Migration Control Wall Design Report (Flood is spelled incorrectly on Volume Cover) + Appendix C - Access way Design September 1989

63. Installation Report for Flood and Migration Control Wall January 8, 1990

64. Installation Report for Flood and Migration Control Wall
Appendix A - ENSR Site Logs

65. Installation Report for Flood and Migration Control Wall
Appendix B - Inspection Reports

66. Installation Report for Flood and Migration Control Wall
Appendix C - Pile Driving Inspection Report January 8, 1990

67. Flood Wall Gate Test Report French Limited Site, February 1990

68. North Pit Remediation Report French Limited Site, November 6, 1989

69. Workplan for the Shallow Aquifer Pumping Tests for the French Limited Site, July 22, 1988 (2 Copies)
(Additional Title - Pumping Test Program for Shallow Alluvial Aquifer Zone)

70. French Limited Site Hurricane Gilbert Preparation Report October, 1988

71. Riverdale Lake Area Remediation Program, August 15, 1989

73. Addendum to Quality Assurance Project Plan for the French Limited Site In Situ Biodegradation Demonstration Phase III, February 16, 1990

74. Potable Water Well Installation Report French Limited Site, December 7, 1988

75. Bioresidue Fixation Alternatives Evaluation Report French Limited Site March 20, 1989

76. Ambient Air Impact Risk Assessment Report, May 5, 1989

77. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume I of III - Summary Report and Appendices A-H, July 1991

78. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume II of III - Appendices I-M, June 1991

79. Shallow Aquifer and Subsoil Remediation Facilities Design Report Volume III of III - Appendices N-P, June 1991

80. French Ltd. Remediation Design Report Executive Summary Bioremediation Shallow Aquifer July 1991

81. January 1992 Monthly Progress Report February 4

    January 1992 Monthly Progress Report Appendices A-B-C

    January 1992 Monthly Progress Report Appendix D

    January 1992 Monthly Progress Report Appendices E-F

    January 1992 Monthly Progress Report Appendix G

82. February 1992 Monthly Progress Report

    February 1992 Monthly Progress Report Appendices A-B

    February 1992 Monthly Progress Report Appendices C-1 and C-2

    February 1992 Monthly Progress Report Appendices D-E

83. July 1992 Monthly Progress Report with Appendices A-B

84. December 1992 Monthly Progress Report

    December 1992 Monthly Progress Report Appendices A-B

85. January 1993 Monthly Progress Report

86. February 1993 Monthly Progress Report

87. March 1993 Monthly Progress Report

88. April 1993 Monthly Progress Report

90. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume III, November 30, 1987 + Appendices
    Lab Report - Page 138 Missing
    Pages 1280 to 1287 Missing (Missing at Site)

90a. In Situ Biodegradation Demonstration Supplemental Report French Limited Site Volume V + Appendices, November 30, 1987

90b. In Situ Biodegradation Demonstration French Limited Monthly Report for January, 1988 or January Monthly Report Equipment Evaluation Phase IV

91. French Limited Administrative Records Index

92. ARCS Remedial Activities at Uncontrolled Hazardous Waste Sites in the Zone of Regions VI, VII, VIII

    Volume I Cell 2 Remediation Verified Report FLTG

    Volume II Cell 2 Remediation Verified Report FLTG

    Volume III Cell 2 Remediation Verified Report FLTG

    Volume IV Cell 2 Remediation Verified Report FLTG

    Volume V Cell 2 Remediation Verified Report FLTG

    Volume VI Cell 2 Remediation Verified Report FLTG

93. Monthly Summary Report May, 1993

94. Monthly Summary Report June, 1993

95. Monthly Summary Report July, 1993

96. Monthly Summary Report August, 1993

97. Monthly Summary Report September, 1993

98. Monthly Summary Report October, 1993

99. Monthly Summary Report November, 1993

100. Monthly Summary Report December, 1993

101. Monthly Summary Report January, 1994

102. Monthly Summary Report February, 1994

103. Monthly Summary Report March, 1994

BROWN FOLDERS:

1. Administrative Record Index
Administrative Record 2-28-84
Technical Comments on Remediation Investigation Report 2-84
Supplemental Investigation - Resource Engr. 1-84
Administrative Record 3-9-84

2. Miscellaneous Small EPA Newsletters/Reports

3. Supplementary Investigative - Resource Engr. 5-84 (2 Copies)
Administrative Record 8-31-84
Technical and Regulatory concepts for In-Place Closure - Resource Engr. 9-84
Administrative Record 10-29-84 - 1-22-85
Region IV Environmental Protection Agency and Texas Department of Water Resources - Resource Engr. 2-85

4. Administrative Record 2-4-85

5. Administrative Record 4-8-85 - 11-26-85
Deep Aquifer Technical Report 12-3-85
Quality Assurance Program for FLTG Phase III
1985 Field Service Report 1-86
1985 Field Service Appendices 1-86
Administrative Record 2-14-86 - 4-4-86

6. Administrative Record 4-1-86
Remedial Investigation Report Appendices Volume II 4-86

7. Administrative Record 4-1-86

8. Administrative Record 5-8-86 - 5-12-86
Remedial Investigation Report - Resource Engr. 6-86 (Duplicate)
Administrative Record 6-1-86

Laboratory Evaluation of Biodegradation at French Limited Site
1986 Field Investigation French Limited Site 12-86
Applied Hydrology Assc. Inc.
Administrative Record 1-5-87
Endangerment Assessment Report French Limited Site 2-87
Texas Water Commission Feasibility Study Report 3-87

9. Administrative Report 3-11-87 - 3-25-87
Quality Assurance Project Plan for French Limited Site
In Situ Biodegradation Demonstration Phase II 3-87
Remedial Planning Activities at Selected Uncontrolled Hazardous Waste Sites
Zone II EPA
Administrative Report 4-1-87
Proposed In Situ Biodegradation Demonstration French Limited Site Phase III 4-87
Administrative Report 4-7-87

10. Administrative Report 4-15-87 - 5-I-87
French Limited Focused Feasibility Study, ERT 5-87
Administrative Report 5-21-87 - 7-2-87
Revised Field Evaluation of Biodegradation at French Limited Site Phase II Vol. I

11. Administrative Report 7-20-87 - 11-23-87
In Situ Biodegradation Demonstration Report Vol. I Executive Summary 10-87
French Limited Site Work Plan Vol. I Project Activities and Sample Plan -
Lockwood, Andrews and Newman, Inc.
Administrative Report Undated Documents 000122-000134

MICROFICHE FIELD REPORTS 1988

During the month of April, the status of both libraries has been reviewed and the above information found to be accurate.

9.0 WETLANDS RESTORATION

9.1 Summary of Activities and Progress

Completed the site evaluation and selection report and issued to the agency review committee for comment.

Developed the design plan for the Brownwood site and reviewed the plan with the agencies. Adjusted the conceptual plan to accommodate land ownership issues and to increase the hydraulic exchange during the tidal cycles.

All the Brownwood soils data was received; the data confirmed no negative factors which could affect wetlands quality.

Developed and submitted a draft access agreement to the City of Baytown.

9.2 Problem Areas and Solutions

Problem	Recommended Solution
Crosby/Barrett opposition to selection of Brownwood.	Explain selection process; respond to questions and concerns; maintain agency support; establish FLTG/-Community Action Committee.

9.3 Problems Resolved

None.

9.4 Deliverables Submitted

Complete site evaluation report.

9.5 Upcoming Events and Activities

Respond to agency comments on site evaluation and selection report.

Start detailed design for Brownwood.

Develop final agreement between FLTG and Baytown.

Develop detailed cost estimate for Brownwood.